Engin. ary

MAY 14, 1942

MAY 15 1942

The IRON AGE

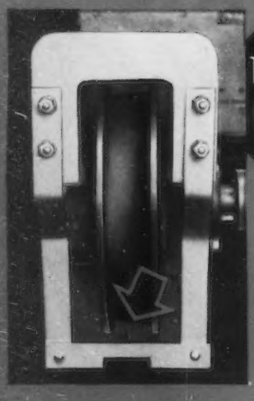
The WEAN ENGINEERING Company, Inc.
WARREN, OHIO

WHEN the U. S. supply of tin was drastically curtailed, the tin plate industry faced a critical situation.

The Wean Engineering Company was ready for the emergency — and is meeting today's demand for equipment to produce tin plate with light coating and, also, equipment to produce chemically treated black plate which entirely eliminates the use of tin.

Subsidiary Company
E BRODEN CONSTRUCTION CO., CLEVELAND, OHIO
Mfgrs. of Strip and Wire Mill Machinery

THAT SHOWS IT'S BUILT TO LAST



TAPERED-TREAD DRIVE WHEELS reduce Noise and Wear in WHITING CRANES

The load on the bridge drive is reduced, and the crane is kept squarely on the runway without binding.

It doesn't take an engineer to know that noise means wear and tear. Quiet operation can only come from careful construction.

Whiting cranes have heavy duty anti-friction roller bearings . . . smooth-running gears . . . flexible couplings for power transmission . . . tapered-tread wheels . . . oil-flushed load brakes . . . rotating axle bearings—features that assure long life and low maintenance cost. Whiting cranes are the quietest cranes you ever heard.

Capacities from one to 400 tons. Also electric hoists from ½ to 7½ tons. Whiting Corporation, 15601 Lathrop Ave., Harvey, Ill. *Builders of quality cranes for over fifty years.*

SEND FOR BOOKLET "How to Write a Traveling Crane Specification"

WHITING *Quiet-Running*

OVERHEAD TRAVELING CRANES

MAY 14, 1942
VOL. 149, NO. 20

J. H. VAN DEVENTER
President and Editor
C. S. BAUR
Vice-President and General Manager

o o o

Managing Editor, T. W. LIPPERT
News & Markets Editor, J. A. ROWAN
Technical Editor, F. J. OLIVER

Associate Editors
D. R. JAMES
W. A. PHAIR T. E. LLOYD
Art Editor, F. J. WINTERS

Editorial Assistants
M. M. SCHIEN G. B. WILLIAMS
J. I. BUTZNER S. H. BARMASEL

Washington Editor
L. W. MOFFETT

Resident District Editors
T. C. CAMPBELL, Pittsburgh HERMAN L. KLEIN, Chicago
B. W. CORRADO, Cleveland W. F. SHERMAN, Detroit
CHARLES POST, San Francisco

Editorial Correspondents
W. P. DEARING, Buffalo ROBERT G. McINTOSH, Cincinnati
G. FRAZAR, Boston R. RAYMOND KAY, Los Angeles
HUGH SHARP, Milwaukee JOHN C. McCUNE, Birmingham
F. SANDERSON, Toronto, Ontario ROY M. EDMONDS, St. Louis
C. H. BACON, Seattle

o o o

A. H. DIX, Manager Reader Service

o o o

Advertising Staff
Emerson Findley, Robert F. Blair } 621 Union Bldg., Cleveland
B. L. Herman, Chilton Bldg., Philadelphia
H. K. Hottenstein, 1012 Otis Bldg., Chicago
R. Raymond Kay, 2420 Cheremoya Ave., Los Angeles, Cal.
H. E. Leonard, 100 East 42nd St., New York
Peirce Lewis, 7310 Woodward Ave., Detroit
C. H. Ober, 100 East 42nd St., New York
W. B. Robinson, W. J. Fitzgerald 428 Park Bldg., Pittsburgh
D. C. Warren, P. O. Box 81, Hartford, Conn.
O. L. Johnson, Market Research Mgr.
B. H. Hayes, Production Manager.
R. E. Baur, Typography and Layout.

o o o

Member, Audit Bureau of Circulations
Member, Associated Business Papers
Indexed in the Industrial Arts Index. Published every Thursday. Subscription Price North America, South America and U. S. Possessions, $8; Foreign, $15 a year.
Single copy, 35 cents.
Cable Address "Ironage N. Y."

o o o

Owned and Published by
CHILTON COMPANY
(Incorporated)

Executive Offices	Editorial and Advertising Offices
Chestnut and 56th Sts.	100 East 42nd St.
Philadelphia, Pa.	New York, N. Y.
U.S.A.	U.S.A.

OFFICERS AND DIRECTORS
C. A. MUSSELMAN, *President*
JOS. S. HILDRETH, Vice-President
GEORGE H. GRIFFITHS, Vice-President
EVERIT B. TERHUNE, Vice-President
J. H. VAN DEVENTER, Vice-President
C. S. BAUR, Vice-President
WILLIAM A. BARBER, Treasurer
JOHN BLAIR MOFFETT, Secretary
JULIAN CHASE, THOMAS L. KANE,
G. C. BUZBY, P. M. FAHRENDORF,
HARRY V. DUFFY CHARLES J. HEALE

This Week in . . .

THE IRON AGE

Editorial
Our Industry Goes "All Out" 39

Technical Articles
Carbide Tools for Shell Work 41
Radiography as a Foundry Tool 45
Silvered Glass Floor Lamp 48
Metal Cleaning 49
Novel Packing Table 51
Bolts—Material, Heat Treatment, Physical Properties 57
Micro and Macro Structures of Gray Iron 58
Calculation of Milling Feeds and Speeds 62
New Equipment: Plant Service Apparatus 63
Aluminum Can Be Brazed 79

Features
Assembly Line 70
Washington 72
West Coast 76
Fatigue Cracks 80
Dear Editor 82

News and Markets
This Industrial Week 84
News of Industry 87
Personals and Obituaries 124
Machine Tool Activity 131
Non-Ferrous Metals 132
Scrap Markets 133
Iron and Steel Scrap Prices 135
Comparison of Prices 136
Finished Steel Prices 138
Warehouse Prices 140

o o o

Products Advertised 162
Index to Advertiser 199

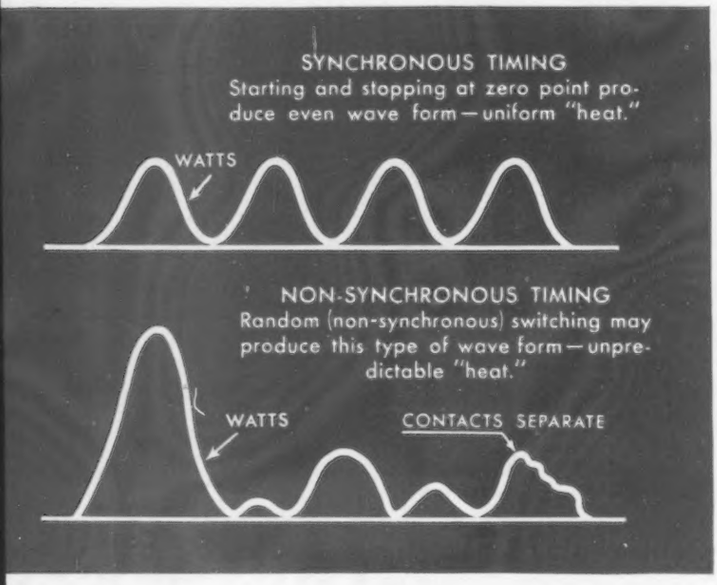
Copyright, 1942, by Chilton Company (Inc.)

Reduce Rejects

on short-time welds...with Westinghouse

SYNCHRONOUS TIMERS

Type SX, combination timer, fully electronic. For spot, seam or pulsation welding. Where frequent changes of timing are necessary.


SYNCHRONOUS TIMING
Starting and stopping at zero point produce even wave form—uniform "heat."
WATTS
NON-SYNCHRONOUS TIMING
Random (non-synchronous) switching may produce this type of wave form—unpredictable "heat."
WATTS
CONTACTS SEPARATE

THE IGNITRON TUBE PIONEERED BY WESTINGHOUSE Makes Possible Split-Second Timing

The Westinghouse development of the Ignitron tube has made it possible to make and break circuits noiselessly with split-second accuracy as many as 600 times a minute without any moving parts.

Where thin pieces or metals with critical fusion points are to be welded, random (nonsynchronous) switching is responsible for a high rate of rejects. Unpredictable transients mean unpredictable heat—burn through, warping, and even cold welds.

Westinghouse Synchronous Timers eliminate these transients—they start and stop current always on the zero point of the current wave, or later (when heat control is used). As a result, each weld is a duplicate of the preceding one because its wave form is the same.

With these Westinghouse Timers, you can mass-produce short-time welds of uniform strength and soundness. Metallurgical characteristics can be controlled (stainless steel will not lose its stainless properties) and appearance is improved by holding indentation to a minimum.

There's a Westinghouse Control that will fit your present requirements, whether it's production seam welding only, or a combination of spot, pulsation, and seam welding. Ask your Westinghouse representative for the facts about this precision electronic control. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., Dept. 7-N.

J-21225

Westinghouse

RESISTANCE WELDING CONTROL

THE IRON AGE

MAY 14, 1942

ESTABLISHED 1855

Our Industry Goes "All Out"

SHORTLY, when the recent orders take effect, every pound of steel produced in this country together with every pound of copper, brass, aluminum or other metal will be directed to the war effort. This is the first time in modern history that such a complete concentration of resources has been devoted to a single purpose. And the fact that the United States, greatest metal producer and consumer of all nations, is thus "shooting the works" on victory is illuminating in its portrayal of the size of the job we have to do.

As a logical and inescapable sequence to the diversion of materials to war purpose is the devotion of man power in the industry to the same objective. Materials, man power, machine power, horse power are inextricably linked in our industry and where one goes, the rest must follow.

What will this mean to the metal-working industry?

What will it mean to those consumers of metal products who cannot claim even a remote relationship to Mars?

I will answer the latter first because it is simpler.

Fortunately for consumers, metal products are capable of lasting for quite a while. They wear out slowly and indeed have usually been discarded long before the termination of their natural life.

The civilian population cannot exist on the food that it has previously bought because that has been consumed. But it can very well make its present frying pans, typewriters, coat hangers, cuspidors and hairpins do for many, many months to come, in a pinch.

As for the producers of steel and other metals and those who convert these materials into metal products, their ways of doing business are being changed far more than is the nature of their products.

Some people seem to think that automobile production has ceased and that the automotive industry is now devoted to making planes, tanks and guns. It is still making lots of cars but the people who will drive them are soldiers and not civilians.

U. S. Steel and Bethlehem and all of our other producers of this precious metal are still in the steel business and will be for the duration and long afterwards. And they are still turning out their accustomed product—steel.

Directly and indirectly, for the war effort and for the use of the men in the lines and behind the lines who are executing that effort, there are very few metal products that will not be required to play their part in our program. There will not be as many "discontinued lines," aside from novelties and luxury products, as one might think. For Mars needs nearly everything.

The pinch comes with the producer who is so small that Mars cannot see him or whose voice is so weak that Mars cannot hear him. The big fellows have already "converted" and will have plenty of business, but many of these little fellows are still serving civilians needs for want of war work.

Waste no tears, friends, on the plight of the consumer nor the chance of survival of the large industrial concern. But lend a hand to the little fellow, now. He needs it, and we need him if we expect to emerge as a democracy.

J. H. Van Deventer

Here is Available Plant Capacity

Contracts or Subcontracts Will Put These Men and Machines into the Fight

Throughout the Middle West are many plants that are available part or all the time for additional war work.

Inland has asked many of these plants with available equipment to prepare brief outlines of their facilities for war work. Some of the outlines are listed below for the purpose of helping these manufacturers make contacts with overloaded "prime" contractors and Government agencies.

Write, or wire, Inland for the names and addresses of any of the following plants. Even if the type of plant you need is not listed, it may pay you to get in touch with us because we have and are continuing to assemble information on additional plants.

IS-28 Mich. washing and ironing machine mfr. emp. 835 workers with complete modern mfg. and shipping facilities. Equip. includes punch presses, welders, benders, bead rollers, cold rolled forming machines, dryer ovens, riveters, sheet rollers, roller levelers, sander discs, slitters, shears, spray booths and complete bonderizing equip.

IS-29 Wis. mfr. of small farm equip. and hardware emp. about 125 men per shift, has approx. 20,000 sq. ft. of fl. sp. plus 11,000 sq. ft. of warehouse. Equip. includes turret and engine lathes, shapers, multiple spindle drill press, many punch and drill presses, external grinders, bulldozers, and wood working equip., blacksmith shop and paint room. Well equipped to machine to reasonable tolerances, and considerable space for floor and bench assembly.

IS-30 Large Iowa mfr. of farm equip. and sheet metal products desires more war work. Facilities include 6, 14" and 16" engine lathes and turret lathes; 15 punch presses up to 90 t.; 3 press brakes up to 3/16"x12'; 2 bulldozers; 5 arc welders; 4 sheet metal shears up to 12 ga. 10'; 11 drill presses up to 30"; complete tool room for dies and jigs; Bonderizing plant; Electro-gal. plant; spray booths and baking ovens; drafting and engineering depts.

IS-31 Wis. stove and range mfr. with over 50,000 sq. ft. of fl. space, emp. 58; has machinery including lathes, shapers, boring mill, presses, brakes, tapping machine, shears, saws, welders, grinders, polishing machines, complete grey iron fdry., core ovens, sandblasting equip., enameling dept. Completely equipped power house. Are financially dependable with ample labor and capable management.

IS-32 Wis. appliance mfr. completely equip. for sheet metal fabrication emp. 1,000, has 500,000 sq. ft. of fl. sp., excellent shipping facilities. Fabricating equip. includes: 129 punch presses (4 to 150 tons). 5 toggle and draw presses, 40 hand folders, 3 box brakes, 5 power seamers, drill presses, power and foot shears, circle shear, metal and wood saws, wire cutters, 30 resistance and 1 electric arc welders. Mach. shop has auto. screw machines, turret, speed and eng. lathes, milling machines, weaving looms, warping machines. Tool room includes: 8 eng. lathes, 3 milling machines, 2 filing machines, 5 shapers, 4 grinders and 1 planer. Plating equip. for nickel, cadmium, chrome and copper including polishing and buffing. Have 3 conveyor and 3 stationary ovens, pressure and spraying tanks, booths and dip tanks, complete porcelain enameling equipment, also cast iron fdry.

IS-33 Large Iowa agricultural hardware and appliance mfr. with 3-acre daylight factory has available punch presses, welders and sheet metal machinery for sub-contracting war work including spot, gun, foot and arc welders, power and hand brakes, power and foot shears, punch, drill and hor. presses, bake oven, spraying booths, rip, cut off, and bank saws, and power hack saws, turning and machining lathes, sanding machines, bulldozers, power hammers, eye benders, shapers, milling machines, radial drills, horizontal and tapping machines, speed and polishing grinders, riveting machines, and air compressors. Plant has available facilities for truck and railroad shipment, incorporated 30 yrs., high financial standing.

IS-34 Wis. steel fabricator of plate and sheet metal products has available 17,000 sq. ft. of production space with equip. including No. 4 vertical punch, high speed power brake, No. 3 shear, 2, No. 6 bending rolls, drill press, and blacksmith forger equip., also air compressor, 11 arc welders, flame cutter, acetylene cutting units, and portable saw rig, 40 productive emp. mfg. dump bodies, frames, chassis parts, rock bodies, etc.

IS-35 Mich. furniture mfr. with over 400 emp. desires contracts or sub-contracts involving sheet metal work. Has modern plant with approx. 8 acres of fl. sp. Equip. includes 7—10', 1—6', 3—4' metal shears, 8—10', 3—8', 1—6', 2—5', 1—4', 1—3' power benders, 17 single action punch presses, 13 inclinable power punch presses, 2 deep gap power presses, 1 arch power press, 38 elec. spot welders, 2 belt sanders, 4 fl. grinders, 3 drill presses, 2 riveting machines, 1 buffing machine, 6 gas welders, 1 arc welder, 1 tumbler, 1 cutting shear, 2 surface grinders, 3 lathes, 2 planers, 3 shapers, 1 milling planer, 3 drill presses, 1 filing mach., 1 screw press, 3 power hack saws, 1 contour saw, and 1 metal band saw.

IS-36 Iowa agricultural mach. and equip. mfr. with 350 emp. working one and one-half shifts, has 96,800 sq. ft. of pl. fl. sp. and two acres available for exp. Transportation facilities from three ry. and six trucking co. Having just comp. Gov. sub-contract work has available equip. including 5 auto. screw machines, 3 bulldozers, 3 hammers, 9 furnaces, 2 forges, 2 forging furnaces, 7 gear hobbers, 13 grinders, 3 key seaters, 22 eng. lathes, 8 speed spinning lathes, 9 turret lathes, 12 milling machines, 7 presses (arbor), 3 draw presses, and 33 drill presses, 10 punch presses, 4 metal saws, 2 shapers, 2 rotary shears, bending roll, bench folder, and sheet shear, threading machines, 5 welders, with complete wood working and misc. mach. shop equip.

IS-37 Wis. toy and stamping mfr. with two factory buildings (300,000 sq. ft.) emp. nearly 1,000, has facilities for war contract work including punch presses (2-ton hydr. to No. 3), cadmium and nickel plating equip., arc, gas, spot and butt welding, spray booths and dipping equip., also complete wood working dept.

IS-38 Large steel furnace mfr. and fabricator of sheet metal products in Iowa with excellent shipping facilities. Total fact. sp. 175,000 sq. ft. including warehouse and storage, emp. nearly 700. Equip. includes 6 power shears, 5 foot shears, 3 special shears, 4 power press brakes, 3 sheet metal brakes, 1 special folder, 8 punch presses, 1 special forming press, 1 special flanger, 3 initial type rolls, 9 riveters, 4 gang punches, 2 bulldozers, 5 sheet metal notchers, 7 single punches, 22 welding machines, 15 drill presses, special machines and pattern shop equip., melting equipment, molding machines, cleaning room and finishing equip. including buffing lathes, 4 spray booths, and a baking oven.

Dedicated to Victory

INLAND STEEL CO.

38 S. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City, Cincinnati, New York

Carbide Tools for Shell Work

By GAYLORD G. THOMPSON
District Tool Engineer, Vascoloy-Ramet Corp., Houston, Tex.

AN executive of a shell manufacturing plant was showing a tool engineer a carbide cut-off tool which had just completed a record run of 681 shells with one sharpening of the tool. The executive was confounded by this unusual performance as compared to the customary production of 250 to 350 sheels per tool grind.

"That carbide tool was evidently a 'freak,'" the executive insisted. "It is hard to believe that materials or the machine could have anything to do with such a difference in production. It must be something in the tool—perhaps in the brazing—or, well—something happened during the making of that tool that made it a 'freak'. Now, what the h—l was it? Isn't there some way to check back on that?"

Confined in his own little world of manufacturing activities, this executive did not realize that hundreds of other manufacturers have experienced the same thing with carbide tools. Collectively the gist of their ideas would be accusing carbide tools of having the temperament of a prima donna, the eccentricities of a thoroughbred and the changeableness of a woman's mind.

True, carbide tools do have some peculiarities about them that cause the staid "old timer" mechanic who has worked with high speed steels all his life to cast incredulous glances at this "new breed of pups" that has upset the old routine of steel-cutting procedures. He just can't figure out why the speed is increased when the carbide tool dulled too quickly—nor "why the heck there ain't no clearance on top of the tool for the chips to slide off." It just doesn't make sense!

Design has a tremendous bearing on the efficiency of steel-cutting carbide tools. If the design of the tool is faulty, there will be spasmodic performances. On the other hand, a carbide tool designed according to accepted carbide tool procedures may perform in decidedly satisfactory fashion and then suddenly rocket above all heights of calculated endurance and thus be stamped as a freak. Now then, this freak performance is not an exclusive characteristic of carbide tools. Other steel cutting materials, too, show considerable variation in performances within their range of respective capacities. A "lucky run" of a uniform grade of material being machined is a very important factor in unusual tool performances. Shop executives are prone to overlook this fact and if it is called to their attention, dismiss such possibilities as too fantastic—that the odds are too great against such possibilities.

Proper carbide tool design practically forces the blame of occasional freak performances on to the materials being machined. In discussing this matter, it is of first interest to consider carbide cut-off tools and rough turning tools. These tools take about the

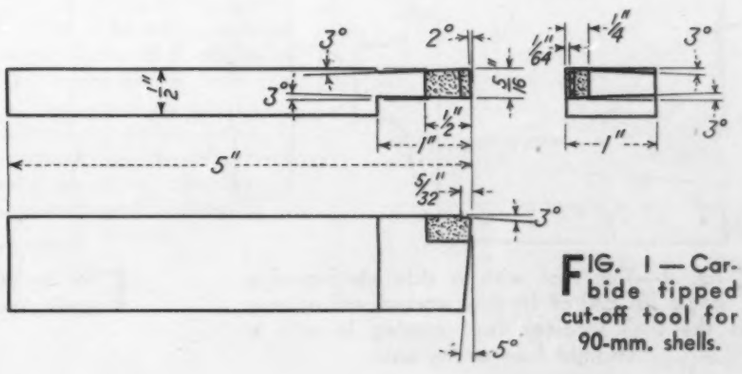


FIG. 1—Carbide tipped cut-off tool for 90-mm. shells.

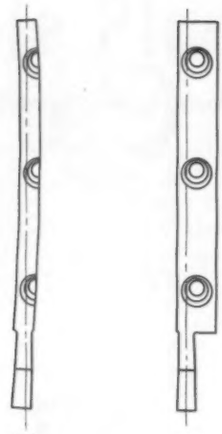
ABOVE

FIG. 2—Ring of metal removed in the cut-off operation. The wall of the rough forging is about 11/16 in. thick.

° ° °

RIGHT

FIG. 3—Too thin a shank for a cut-off tool leads to danger of the tool being forced out of alinement by the setscrews as shown at the left.



severest punishment of any tools used in shell production.

The tool that made the record mentioned in the first paragraph is shown in Fig. 1. This carbide cut-off tool was operated at a speed of 303 ft. per min. with a feed of 0.005 in. When the shells were rough and thick scaled, the speed was changed to 266 ft. per min. to provide more power for the machine to operate the tool at a feed of 0.012 in. This latter speed and feed, however, is not recommended for regular production where shells are fairly smooth and uniform. The feed of 0.012 in. was used so as to get the cutting edge of the carbide tool through the rough scaled surface and into the steel before any great damage is done to the cutting edge.

Fig. 2 shows the nose-end of the shell on which the cut-off operation was performed. The wall of the rough shell is approximately 11/16 in. thick.

Until recent months, manufacturers of carbide tools were a little leery about recommending carbide cut-off tools—especially for steel. There was too much danger of "weave" and to overcome this possibility the tools recommended had so much width that if they did not chatter in operation, they would be removing too much good material. The size of the carbide tip also boosted the cost excessively.

It is a definite necessity that the width of a carbide cut-off tool be kept within a proportionate range of its capacity. In other words, the cut-off tool shown in Fig. 3 has a cutting edge 5/16 in. wide and can cut into material to a depth of approximately 1 in. as limited by the length of the blade from the cutting edge to the shoulder on the shank. This tool will cut-off a solid piece of steel with a maximum diameter of approximately 2 in. or steel tubing with a wall approximately 1 in. thick. Now then if the 5/16 in. wide blade were used with a tool depth capacity of 2 in. instead of the 1 in. as shown in Fig. 1, the danger of weave would be decidedly greater and would put a severe bending strain on the relatively inelastic carbide tip. The length of the carbide tip should not extend beyond the possible bending point of the blade in the event of its weaving.

Blame is often placed upon the carbide tip when the cut-off tool fails to perform satisfactorily. Here again, the design might be at fault. Many tool engineers, in their commendable efforts to conserve steel and simplify construction, grasp at the idea of using thin bar stock equivalent in thickness to the width of the carbide cut-off tool they wish to make. The

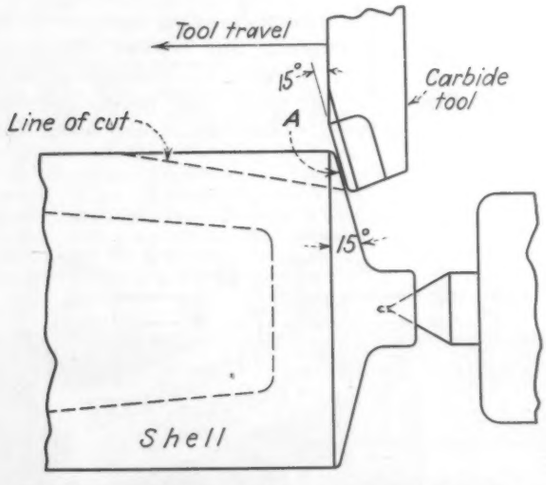


FIG. 4—This tool with a side cutting-edge angle (SCEA) of 15 deg. worked well as long as the shell forgings kept coming in with a straight face at the base.

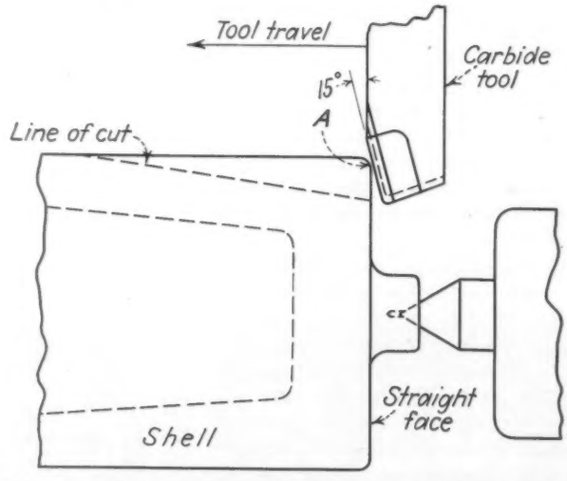


FIG. 5—With a 15-deg. draft angle on the bases of the shells, tools with a lead angle or SCEA of 15 deg. start to give trouble.

fallacy of this thin-shanked cut-off tool is illustrated in Fig. 3, at *A*. When the operator clamped this tool in the turret, the three set screws ate their way into the shank and distorted the alinement of the tool. Any mechanic knows what this will do to the business end of the tool when it starts to work. Ten times out of 10 it will jam in the cut and break the tool and perhaps spoil expensive material. In fact, a cut-off tool of this type did cause considerable trouble on shell work, protective shims not withstanding.

The design as shown at *B*, Fig. 3, illustrates how a wider shank takes the set screw impressions without distorting the alinement of the tool. In any event however, it is always best to use a properly hardened shim between the screw points and the tool shank. This will permit a greater degree of fine adjustments because there will be no screw "pockets" to pull the tool back into an undesirable position when screws are tightened.

Carbide Turning Tools

In the design of a steel-cutting carbide turning tool, the side-cutting-edge-angle, which is also called lead angle, plays an extremely important role in the efficient performance of the tool. This angle is shown as 15 deg. in Figs. 4 and 5. Future reference to this angle will be noted as SCEA, a rather universally understood initialed code for side-cutting-edge-angle (American Standard B 5.13-1939, Terminology and Definitions for Single Point Cutting Tools).

A certain shell manufacturer was having considerable difficulty with steel cutting carbide tools for rough turning shells. When shell manufacturing first started in his plant, the shell forgings had a straight face at the base, as in Fig. 4. The 15 deg. SCEA on the carbide tool was sufficient for this type of forging and production went along very nicely with this shell and tool combination.

Suddenly things started to go haywire. Tools started to break up in increasing amounts until it was finally necessary to get shipments of more tools via air express from the manufacturer. A carbide tool engineer was called in.

Referring again to Fig 4, note that as long as the shells had a square-faced base, the 15 deg. rough turning tool permitted the cut to start at a point back of the nose of the tool where it is strongest as shown at *A*. This is a very much desired condition, whether it is for turning shells or any other steel products.

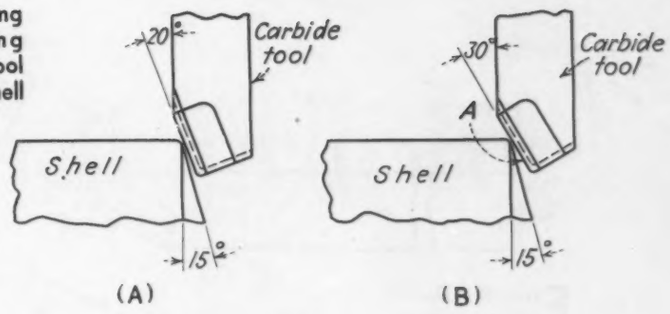


FIG. 6 — Increasing the side cutting angle improves tool performance on shell turning when there is a large draft angle at the base. The tool shown at *B* has produced over 500 90-mm. shell turnings between grinds.

Now then, when the carbide tool engineer came on the job he discovered something. Shells were coming into the production line with 15 deg. draft angles on the face of the bases! And the carbide tools had only a 15 deg. SCEA! HOLD EVERYTHING!

Fig. 5 shows how a 15 deg. base-face lines up with a 15 deg. SCEA on the carbide tool. This condition is a wrecker of dispositions, patience, and TOOLS. Here is a steel-cutting carbide tool abused to the extent that it is forced to flash-cut its way through a ½ in. wall of hard oxidations at the start of the cut. Give this oxidation a *broad front* to work on and it will eventually flatten the cutting edge attack of any steel-cutting tool. This scaled surface of the shell would dull the cutting edge of the tool to such an extent that a portion of the carbide tip is pushed off before the tool can get beneath the oxidized surface and start whittling away at the clean steel.

Now, examine Fig. 6. At *A* is shown a steel-cutting carbide tool that has a 20 deg. SCEA and is considered very popular with shell manufacturers and others. Although this tool does provide for a slight "sneaking in" effect on a shell base with a 15 deg. face, it still works too fast at the start of the cut and almost classifies it with the plunger type as shown in Fig. 5. However, this 20 deg. tool "goes to town" on production of shells with bases having 15 deg. or less on their faces.

Where general all-around carbide tool performance is desired—where a tool is practically prayed for that will meet up with all inconsistencies of shell forgings—Mister, you have a "honey" in the tool shown at *B* in Fig. 6. The 30 deg. SCEA is sufficient to take care of any draft that might be put on the face of the shell base up to 25 deg.—and it is doubtful whether this will ever be approached or exceeded.

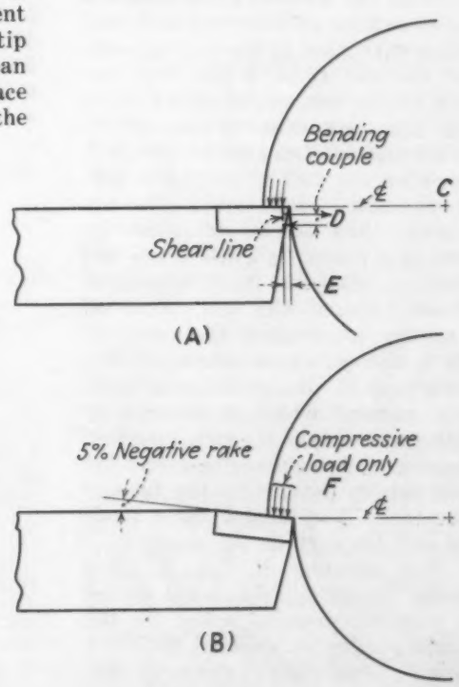


FIG. 7—Introducing a negative rake on a carbide tipped lathe tool places a pure compressive load on the tool, as at *B*, whereas a detrimental shear load is produced by the zero back rake at *A* in combination with a normal front relief of 6 deg.

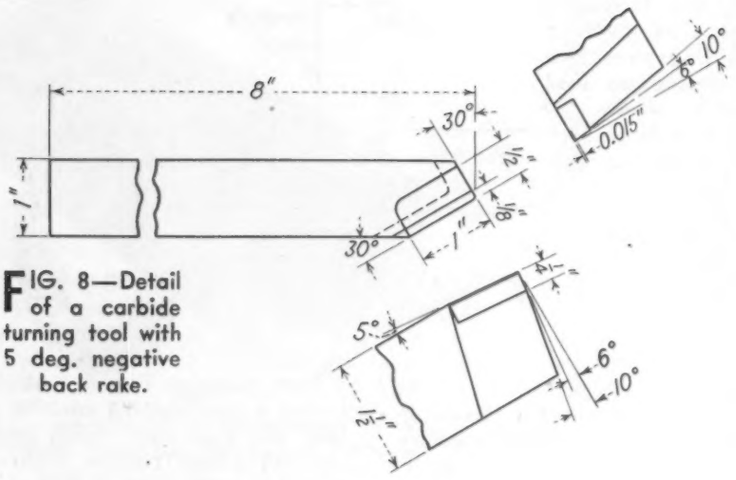


FIG. 8—Detail of a carbide turning tool with 5 deg. negative back rake.

Note how the 30 deg. angle of the tool provides for an "easing in" of the carbide tool into the rough shell. It has a tendency to flake off the scale before this hard material has a chance to do any damage. This tool gets under the scale—undermines it so to speak, so that the balance of the cutting edge has a clean sweep in the machining of the unoxidized steel lying underneath. This design of tool has produced over 500 90-mm. shells with one sharpening. However, there are other factors that contribute to the efficiency of the steel-cutting carbide turning tool. The most important of these other factors is the back rake.

Importance of Back Rake

Fig. 7 at *A* shows a side view of a steel cutting carbide tool with zero back rake, that is the cutting edge of the tool is on a line with the top of the tool shank, which is set on the centerline of the work. With normal front relief or clearance on the tool of around 6 deg. (somewhat exaggerated in the sketch) the forces developed by the chip piling up against the tool tend to break off the overhanging front edge of the tool, since all carbides are weakest in shear. In fact, the cantilever effect of this overhang *E* also produces a bending moment which is resisted by the force couple *D*, with resulting tension and compressive forces being set up parallel to the face of the tool. The tension force tends to pull the carbide tip apart.

Now consider *B*, Fig. 7. The 5-deg. negative rake angle causes a pure compressive action on the cutting edge as denoted by force line *F*. And when it comes to compression—well, carbide tools love to work that way.

A detailed design of the carbide tool with a 5 deg. negative back rake is shown in Fig. 8. This tool also incorporates the 30 deg. SCEA as shown on the tool in Fig. 6*B*. Here is a tool that meets all objections. Its sturdy bull-dog tenacity and its reputation for annihilating surplus steel makes it the ace of them all.

There is, however, a slight objection to this carbide tool as illustrated in Fig. 8. The tool blocks on turret lathes, or on automatic bar machines or chuckers, or on semi-automatic lathes, may be set so that a tool with a 1½ in. high shank will automatically bring the point of the tool on the centerline. Use of a 5-deg. *negative* back rake brings the point of the tool approximately ⅛ in. below the centerline. This is too much for steel-cutting carbide tools. The only way that this can be corrected is to raise the tool blocks ⅛ in. so as to compensate for the 5 deg. negative rake. On the other hand, ⅛ in. could be milled or planed off the top of the shank up to the back of the carbide tip, but this is objectionable because it involves additional tool costs. It is much better to raise the tool blocks and continue to use standard tools without the necessity of mechanical modifications.

Recently a manufacturer of steel-cutting carbide tools adopted a design of carbide turning tool in which the point of the tool is in line with the height of the shank or centerline, while still retaining the desired 5 deg. negative back rake. An example of the design of this tool is illustrated in Fig. 9. Although this tool will not present a completely finished appearance because of the carbide tip sticking above the shank in the rear, it has many points in its favor: There is the 5 deg. negative back rake without sacrificing center alinement, there is the automatic center alinement as with other tools with definite shank heights, and finally there is not so much carbide to be ground when the tool is sharpened.

When carbide tool mortality assumes abnormal proportions in the shop, it should invite investigation. This in turn should resurrect past performance records over which "post mortems" are held. A post mortem doesn't mean a thing unless it is a means to a definite solution of existing problems. If the problem is greater production per tool grind, then the tools as shown in Figs. 8 and 9 should be the answer to the tool engineer's dream.

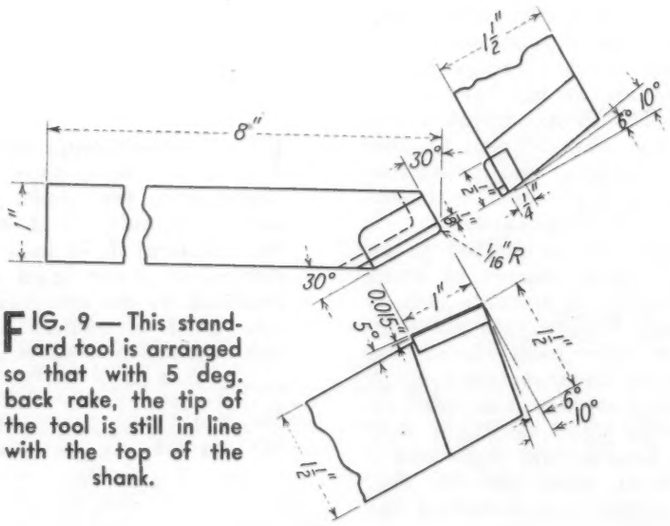


FIG. 9—This standard tool is arranged so that with 5 deg. back rake, the tip of the tool is still in line with the top of the shank.

Radiography as a Foundry Tool

By PHILIP McCAFFERY
Chief of Metallurgy and Research, General Metals Corp., Oakland, Cal.

. . . Use of radiography as a practical foundry tool for producing sound castings, rather than as a method of detecting defective castings, is discussed in this article.

THE use of radiography for the inspection of steel castings is well known. Incorporation of radiographic requirements in Navy specifications for steel castings and the wide use of these specifications in the war program have made progressive foundries familiar with radiographic technique and interpretation. There has been a good deal of information published on this phase of radiography, but less has been said about the use of radiography in the foundry itself and the effect of its use on foundry practice.

The foundryman who has had no experience with radiography is inclined to regard its use as a costly nuisance, to be avoided if possible. He is also somewhat dubious about the accuracy of radiographic interpretation. If the maximum benefit is to be obtained from radiographic equipment one of the first steps consists of demonstrating to the man in the shop that a radiograph can be a very exact picture of conditions inside a casting.

Fortunately, this is easily done. When a shrinkage cavity, or other defect is found in a casting by means of radiography, the negative is taken into the shop and the location of the defect marked on the outside of the casting. Then the metal overlying the defect is chipped or machined away until the defect is exposed. After a few demonstrations of this kind the men in the shop start asking for radiographs on various jobs they suspect may be unsound.

It is obvious that radiographs must be marked in such a way that defects found can be located in the casting accurately. It has been the experience of the General Metals Corp. that at least three marking letters or numbers must be used for this purpose. These are stamped on the casting and lead figures are placed over them so that there can be no question as to the location covered by each film.

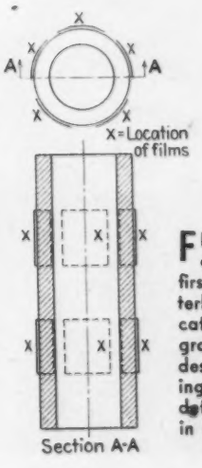


FIG. 1—A cylinder casting which, when first cast, showed centerline weakness indicated by the radiograph in Fig. 2. A redesigning of the casting eliminated this defect, as Fig. 3, taken in the same location as Fig. 2 indicates.

Casting Practice Changed

Radiographic equipment has been in use at a western steel foundry for over a year. In that time casting practice has been changed on numerous castings as a result of radiography. In some cases it has been necessary to change the gating and heading of castings, in other instances the castings themselves have been redesigned.

An example of the latter case is the simple cylindrical casting 4 ft. long and 18 in. in diameter, shown in Fig. 1, which had been cast many times before and which had always been assumed to be sound. The outward appearance of this casting was excellent. Radiographs were taken in the position indicated in Fig. 1. The films showed hot tears throughout a large part of the casting due to centerline weakness, the side walls being uniform through-

FIG. 2 — A radiograph indicating a hot tear due to centerline weakness.

out the length of the cylinder. An example of this defect is shown in Fig. 2.

The successful remedy in this case was to redesign the cylinder with a taper from top to bottom. Radiographs of this tapered cylinder, taken in the same place as those on the defective casting, showed the redesigned piece to be sound throughout. A typical radiograph of the redesigned cylinder is shown in Fig. 3.

The gating of a casting and the position of the risers are factors which greatly modify the sequence of solidification of the sections of a casting and are of the utmost importance in producing sound castings. If a casting is to be free from internal shrinkage cavities and porosity, the principles of directional solidification must be constantly kept in mind and any deviation from those principles is certain to be discovered in radiographic examination.

Gates and risers which have been believed to be satisfactory in the past have been found in many cases to be inadequate. An example of this is illustrated in the radiograph shown in Fig. 4, which was taken through the rim of a pressure door. This door had a very heavy rim and a relatively thin center portion, a design which calls for all the skill and ingenuity a foundryman can command if a sound casting is to be produced. As the radiograph (Fig. 4) shows, the first casting had a shrinkage cavity in the rim. Fig. 5 is a radiograph of a casting made from the same pattern after the position of the gates and risers had been changed. It indicated that the shrinkage cavity had been eliminated. In this case the use of radium showed not only that the casting was unsound, but also gave indications of the size and position of the defects so that corrective measures could be applied with full knowledge of the obstacle to be overcome.

Used for Pressure Work

A foundry making pressure work will occasionally find some castings which leak when subjected to the pressure test. These can often be repaired by chipping out the defective area and repairing by welding.

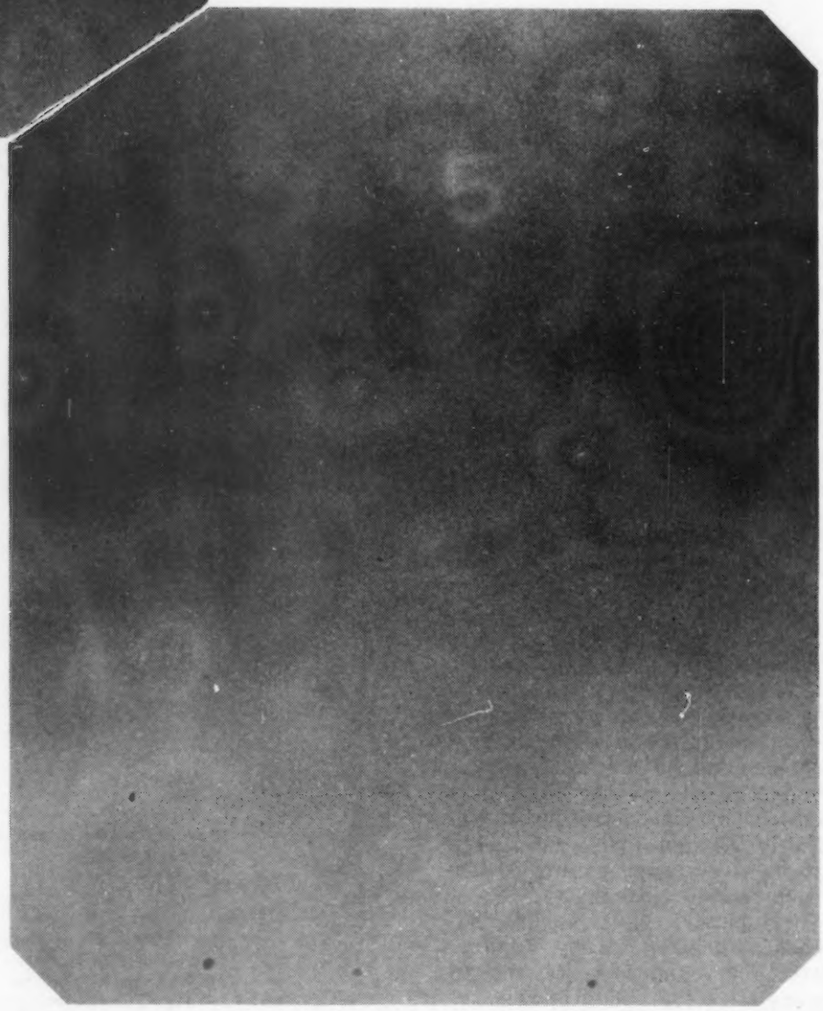


FIG. 3—By redesigning, the defect shown in Fig. 2 was eliminated as this radiograph of a corresponding section shows.

Radiographs are found to be very valuable in these cases, both for determining the extent of the repairs required and for checking the effectiveness of the repair work. A typical example of this is a large piston which was found to "weep" under pressure. Since some machine work had already been done before the leak was discovered, a considerable saving was possible if the casting could be successfully repaired.

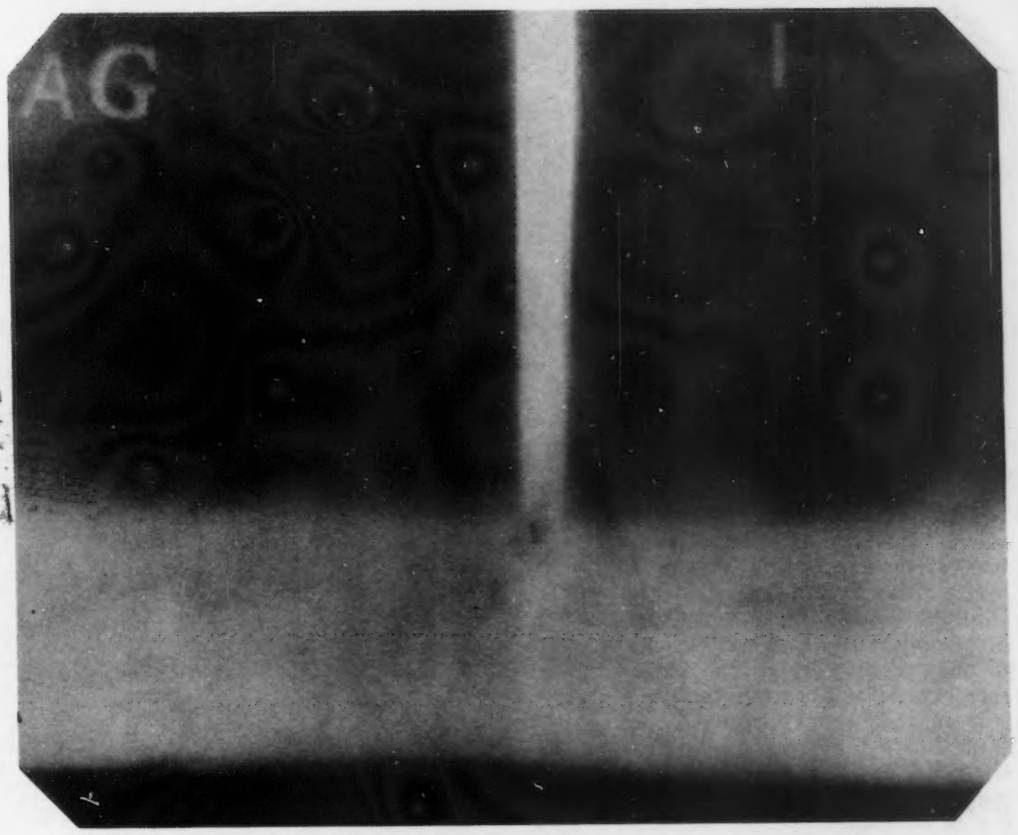


Fig. 4—Shrinkage cavity in a pressure door revealed by radiography.

Although the position of the leak could be roughly estimated by visual inspection, neither its exact location nor its extent was known. If radium had not been available it would have been necessary to make a costly exploration with a torch or a chipping hammer to find and remove the defect. There also remained the possibility that only part of the defective area would be located and the repairs later found inadequate. The suspected area was, therefore, radiographed, with the result shown in Fig. 6. With the exact location and the extent of the defect thus determined, repairs were made quickly and successfully.

It has been found in this type of work that when a defective area has been chipped out, a radiograph taken before welding is useful in determining whether or not the chipper has removed the entire defect. If the radiograph is not taken until after the repair is completed and the repair is then found to be incomplete, the time previously spent in filling the cavity has been wasted.

From the standpoint of overall costs, radium, like all good tools, should be expected to pay for itself. It is able to do this chiefly by decreasing the number of castings rejected during machining because of unsoundness. There is another

o o o

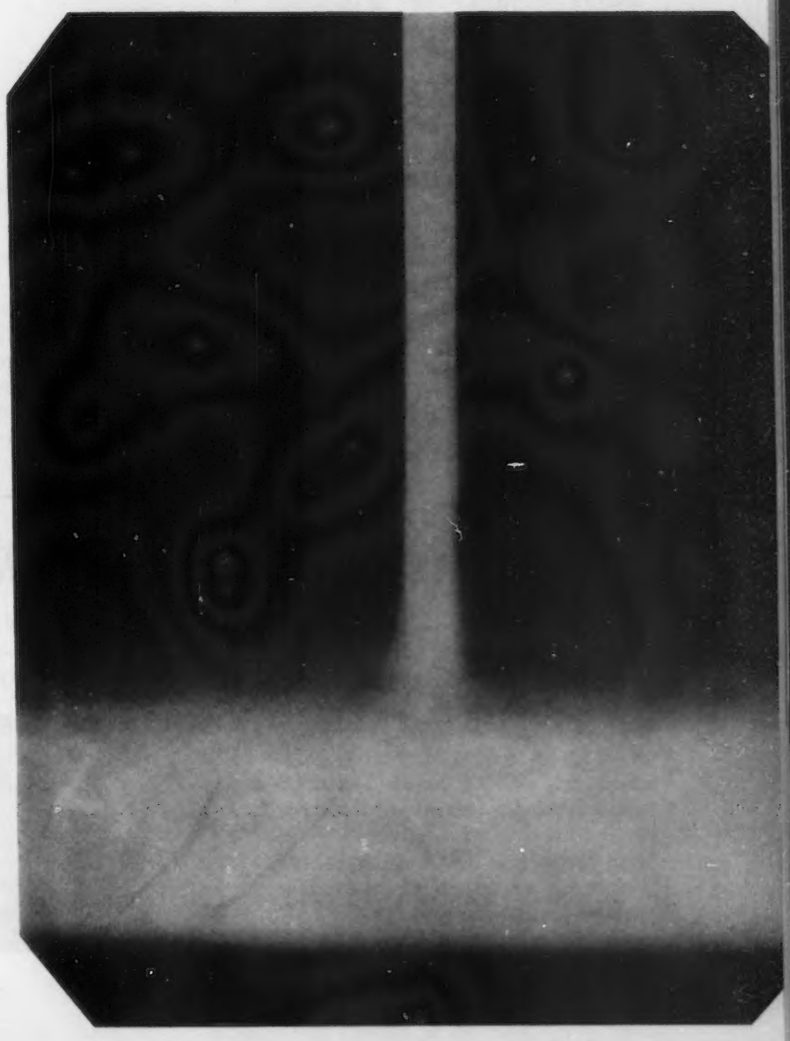


FIG. 5 — By altering the position of the gates and risers of the pressure door shown in Fig. 4, it was possible to eliminate the shrinkage cavity, as this radiograph shows.

o o o

way, however, in which the foundry savings can be made by the use of radium.

Checks Gating Practice

Approximately half the weight of metal poured into a mold is taken up by the casting itself. The rest consists of the pouring system-gates, sprue and risers. On some castings, radiographic examination will show that more risers are needed or that the risers should be made larger. In such cases the yield is lowered and a sound casting is obtained at greater expense.

On the other hand, every shop has castings which carry excessive risers. This usually results from a natural tendency to put risers at every place where there is the slightest possibility of shrinkage developing. There is also a tendency to make risers larger than necessary in order to be certain that they will do their work effectively. If these castings are to be subjected to radiographic examination and control, the necessity for over-risering is no longer present, and the heading of the casting can be developed in such a way that the highest yield consistent with producing sound castings is obtained.

It should be pointed out that it is not necessary to radiograph all castings made from a pattern. The usual practice is to explore thoroughly the first, or pilot casting made. If changes are found advisable in the design or in foundry practice, the casting incorporating the changes is radiographed in the same manner as the first one. Once the molding and pouring procedure has been established, an occasional sample will suffice for control purposes.

Thus far, no specifications for gray iron have included radiographic requirements, nor does it appear that such requirements will be incorporated in gray iron specifications in the near future. For this reason there are few gray iron foundries using radium as a foundry tool. Those gray iron foundries which are associated with steel foundries having radium will find that they, too, can use radiography to good advantage in developing efficient gating and heading practice.

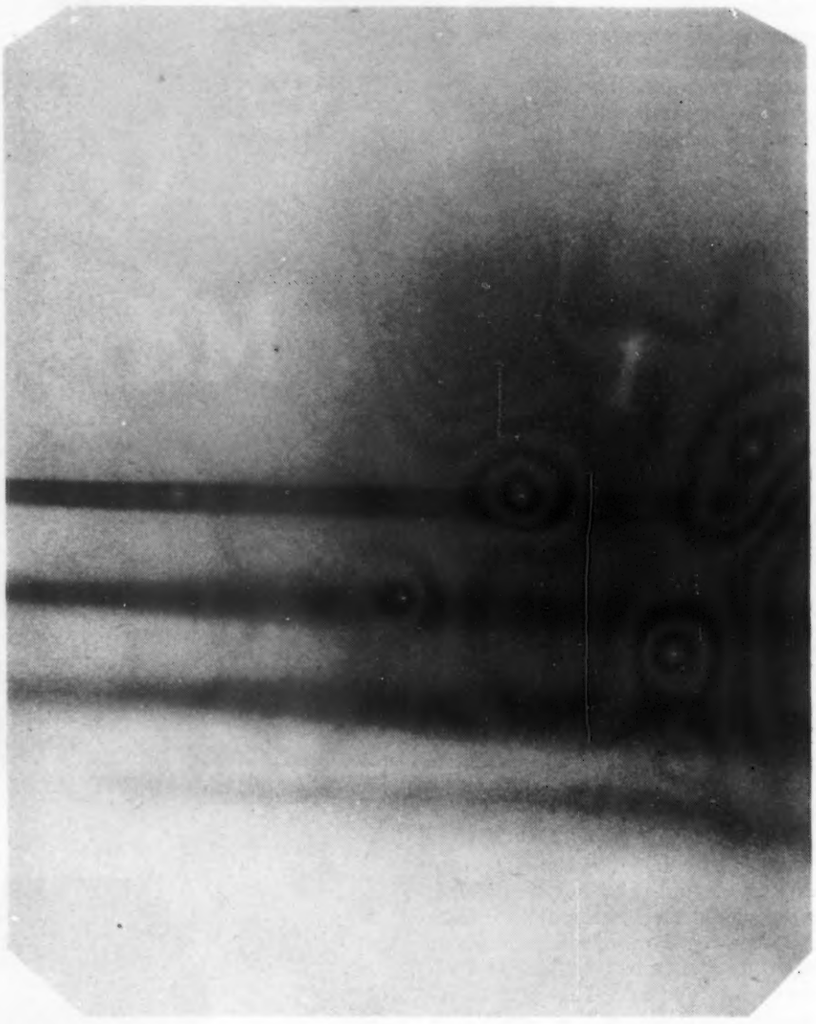


FIG. 6—The extent and location of a porous area in a piston by means of this radiograph eliminated the need of costly exploration with chipping hammer or torch.

Silvered Glass Floor Lamp Base

FACED with shortages of metal for floor and other decorative lamps, one manufacturer has designed a glass base, heavy enough for weight and strength, and coated the underside of it with silver. The effect was one of beauty, with the base having the sparkle of a mirror. By protecting the silver coating with lacquer or enamel, the silver, which is seen through the glass, retains its brilliance.

In the lamp base shown in the accompanying illustration, the hollows or "dimples" on the surface were used for their bead-like decorative effect, but plane or curved surfaces, as well as other surface designs, may be used with varying effects. The silver coating is of almost infinitesimal thickness. Similarly, tubular and other glass parts are readily coated. The lamp base was developed by the Corning Glass Works, Corning, N. Y., and the coating process, it is emphasized by the American Silver Producers' Research Project, is quite simple and economical.

METAL CLEANING

By R. W. MITCHELL
Technical Director, Magnus Chemical Co., Garwood, N. J.

... Shortages of chlorinated solvents bring metal cleaners face to face with the problem of seeking substitute materials and methods. Discussed here is a method using emulsifiable solvents, which are not scarce.

BECAUSE of the scarcity of chlorinated solvents, the War Production Board recently stated that users of these materials for metal cleaning will have to find substitutes, in spite of the fact that the work they are doing may carry high priority ratings. This will affect manufacturers in widely diversified lines. Shortages of chlorinated solvents, already serious, are likely to get worse, and consumers are faced with either a substitution of materials or cleaning methods to carry on production.

However, unlike other materials that became scarce with the advent of the war, the use of chlorinated solvents can be dispensed with to a great degree and manufacturers can use other cleaning methods or materials. One such metal cleaning method is based on an emulsifiable solvent cleaner developed by Magnus Chemical Co., and extensively used for many years in cleaning automobile and truck motors and chassis. The cleaner is sold in the form of a concentrate that is mixed "on the job" with kerosene, a safe solvent, or any similar low cost mineral oil-based solvent. Mixed in proportions of cleaner to solvent of 1:8 to 1:12 parts, the mixture quickly penetrates dirt and grease deposits and loosens them from any metallic surface. It does not act primarily to dissolve and remove the dirt from the surfaces, but rather takes the "cling" out of them and permits removal by a pressure stream of water, leaving a physically clean metal surface.

The cleaning method using this emulsifiable solvent cleaner involves either spraying or dipping the parts in the cleaner, followed shortly by a water cleaning under pressure. According to the method of saturating the part with the cleaner, the cleaning method is known either as Emulso-Spray or Emulso-Dip. Loosened grease, oil and dirt are knocked off the metal and carried away from the work in the emulsion produced by the action of the water on the cleaning solution. After such cleaning, the surface is ready for any finishing operations except those requiring a final cleaning operation to produce a chemically clean surface, such as plating or vitreous enameling. On the metal surface, there will remain a slight film of the solvent, but this will not affect finishing operations where a physically clean surface is sufficient, and will not affect the results of subsequent cleaning methods used to prepare the surface for plating or vitreous enameling.

Emulso-Dip or Emulso-Spray cleaning can be done in most cases with both the cleaning solution and the water spray at room temperature. Where moderate heating is desirable, the solution temperature need never be raised much above room temperature — warm rather than hot. While this is a definite advantage over most cleaning methods, the vital point is that Emulso cleaning will remove many dirts that stubbornly resist other cleaners. Smut on steel is a typical example, while metal particles adhering to the interior or exterior of shell cases as the result of machining operations are readily attacked by this cleaner, whereas vapor degreasing will not touch them.

The penetrating qualities of the emulsion cleaner allow it to loosen the bond between the dirt and the metal surface so that cleaning is thorough. There are few dirts that the emulsion cleaner will not satis-

Forty-eighth in a Series of Articles on the Technical and Economic Aspects of Metal Cleaning and Finishing

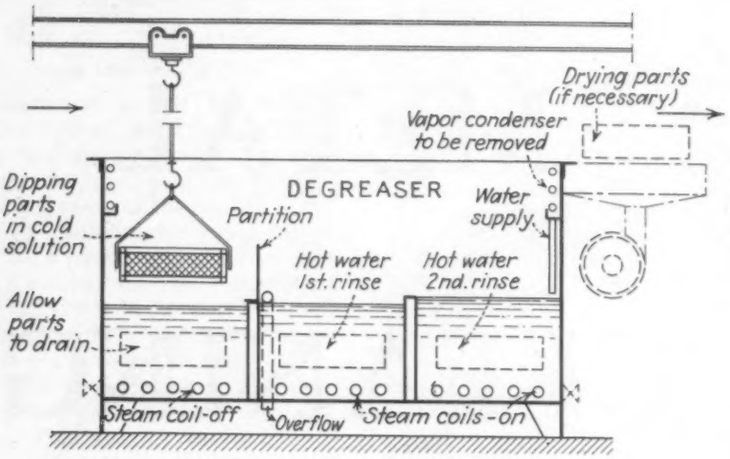


FIG. 1—Shown here is a three bath vapor degreaser that has been converted to a Emulso-Dip cleaner.

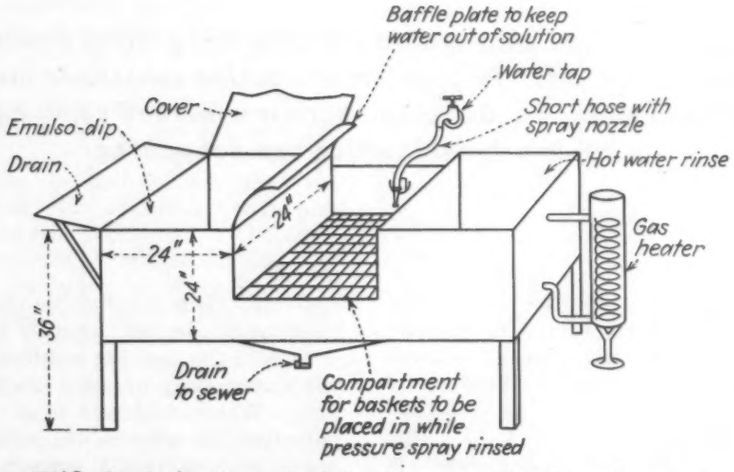


FIG. 2—A cleaning unit of this design was built by a firm that had previously used a vapor degreasing cleaning machine, and found it difficult to obtain necessary chemicals. This cleaner was built locally, and was quite inexpensive.

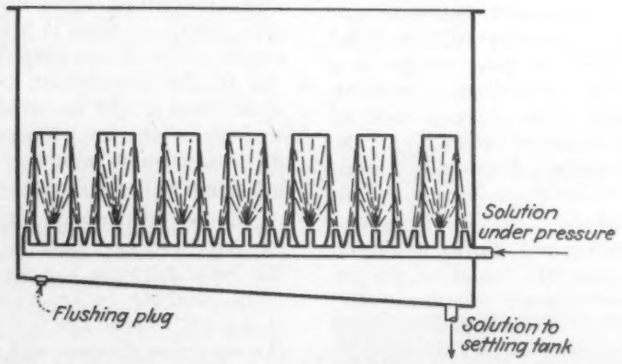


FIG. 3—This set-up for use of emulsifiable solvent cleaner can be used for shells and shell cases. Shells are racked over double nozzles in the cleaning tank; the inside nozzles spray the shell interior and the concentric nozzles spray the exterior. The same arrangement can be used for rinsing the shells. A dip may be used in the cleaning tank if desired.

factorily handle, and it may be used on practically every commercial metal. Since the solution is harmless to all metals, there is no danger of tarnishing, spangling, or otherwise attacking or discoloring the surface of metal cleaned by this method. From the cost viewpoint, the emulsion cleaning method is about 75 per cent cheaper than solvent degreasing both because of the lower cost of cleaning materials and the elimination of heat in the cleaning operation.

The problem in many plants that have in the past used chlorinated solvents for vapor degreasing operations is the shifting over to other metal cleaning methods or other solvents that will work satisfactorily in existing cleaning machines and equipment. The emulsion cleaning method can very easily be adapted to mechanical washing machines.

There are two basic ways to use the emulsion cleaner. One, the Emulso-Spray procedure, is to spray the work with the cleaning solution, allow it to soak for a few minutes and then follow with the water spray rinse. The other procedure, Emulso-Dip, is to dip the work into the cleaning solution for a minute or less, and, after a few seconds' draining, apply the water rinse.

Obviously, many mechanical washing and degreasing machines may be adapted to one or both of these methods with very few changes. On the other hand, by making radical changes in some existing vapor degreasing machines, particularly those arranged for dipping the part in the cleaning solvent, it is possible to adapt this method at moderate expense, as shown in Fig. 1.

Actually, for many operations the cost of setting up new dipping or spraying facilities and water spray rinsing devices is not at all insuperable and the economies of the process with high production rates and improved cleaning will offset the cost of installing the necessary equipment. Where the production rate is high and the volume heavy, and where existing machines cannot be adapted to handle the volume, such special equipment can be designed and built for the two variations of the cleaning method. For example, one company designed a cleaning unit, shown in Fig. 2, based on the Emulso-Dip. This unit was built to clean parts in a basket contain-

er, and the tanks were built locally at very low cost.

Equipment may likewise be designed for cleaning one type of part exclusively if the production rate of such a part warrants a special cleaning machine. Fig. 3 shows a shell cleaning unit in which the shell is racked over double nozzle sprays, one spraying the interior and the other the exterior of the shell. The water rinse sprays are arranged in a similar manner, spraying the interior and exterior of the shell simultaneously. Likewise, a specially adapted machine for cleaning the inside of two gun barrels simultaneously is shown in Fig. 4.

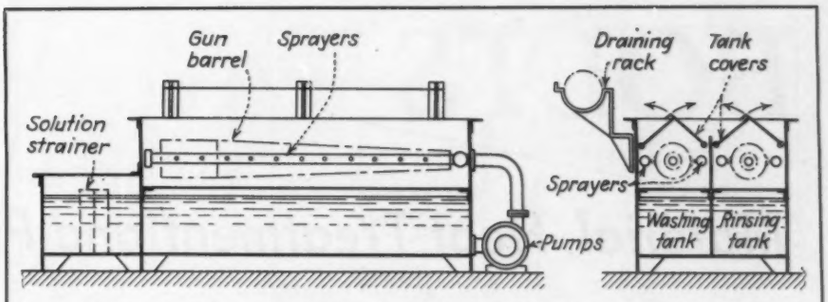


FIG. 4—To clean the inside and outside of gun barrels, this Emulso-Spray tank may be used.

In designing a machine for emulsion cleaning, parts of such shape that will nest readily with other parts or that have recesses hard to drain require individual rather than bulk handling. Such a machine must be arranged for stacking, racking, or container loading of parts in such a fashion that quick, thorough drainage is provided and that the water spray and emulsion will reach all surface. This obstacle is exceptional, however, since the great majority of work is readily accessible to both the cleaning solution or rinsing sprays.

Emulso-Dip and Emulso-Spray methods of metal cleaning have been successfully used for over a year in a number of plants. In a number of shops where large shapes to be cleaned are not readily adapted to spray or dip machines, special spray booths have been constructed in which the large parts are sprayed with the cleaning solution and then rinsed by hosing.

Since finishing of metal surfaces is a utility proposition usually, and chemically clean surfaces, while highly essential in some instances, are not generally required, Emulso cleaning has proved thoroughly satisfactory, and can be used economically and safely, even under hazardous conditions. The cleaner has its limitations, just as any other type of cleaning method, since there is no one complete cleaner applicable to all metal cleaning problems. However, there is every likelihood that cleaning operations now based on the use of scarce chlorinated solvents can be efficiently and economically adapted to and handled by the emulsifiable solvent method.

Novel Packing Table

A 51 per cent reduction in the time required to crate an airplane crankshaft has been effected by the Ohio Crankshaft Co., through the development of a novel wrapping table and a redesigned package.

The wooden packing crates formerly used were heavy, tended to splinter, had a life expectancy of only three trips and were difficult to fasten. In their place, a three-ply corrugated cardboard container has proved highly successful. This 35x18x8-in. box is good for at least six trips It has a solid bottom and top and specially designed cardboard collars to hold the shaft in place; additional compartments hold the counterweights.

Shipping cartons are strapped with 20-gage, ¾-in. steel, so placed as to give support where the shaft weight is greatest. To speed up the strapping a special table was devised. Built to hold two cases, the outer dimensions of the wooden table tops are identical with those of the boxes. The cartons, placed end to end, are separated by a well which holds a supply of the waxed sheets used to wrap the shafts. Four 1-in. channels are sunk in the table top and lined with metal to prevent the straps from sticking. Through them the steel strapping is slipped so that it will pass quickly and easily around the containers.

BOLTS—

Material, Heat Treatment and Physical Properties

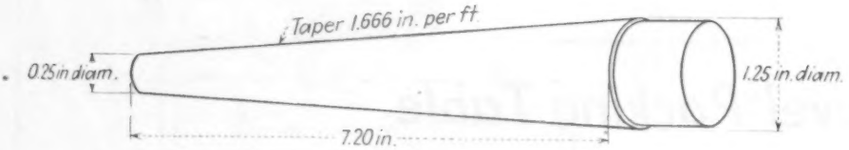
. . . In concluding the discussion of bolt steels, the author describes the heat treatment of medium carbon steel bolts, and presents data on alloy steel bolts.

By A. S. JAMESON

Metallurgist, International Harvester Co., Chicago

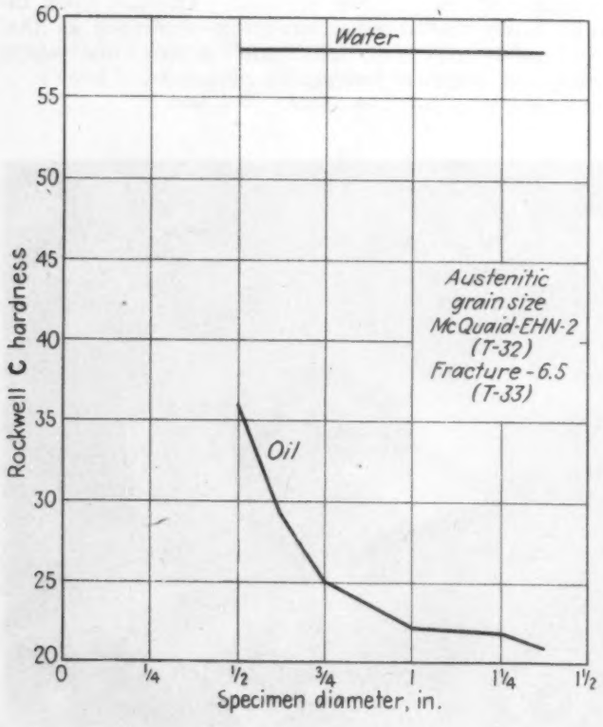
BEFORE proceeding with details of the heat treatment of these carbon steel bolts it might be well to consider a few of the fundamentals involved in the practice. To produce the maximum physical properties, it is necessary to completely harden the cross-section of the bolt in the quenching operation. As well as involving the rate of cooling as controlled by the quenching medium, this also involves the hardness penetration characteristics of the steel.

The behavior of two heats of steel, one containing 0.38 per cent carbon, 0.85 per cent manganese, and 0.26 per cent silicon, and the other containing 0.48 per cent carbon, 0.70 per cent manganese, and 0.27 per cent silicon, both having an austenitic grain size of ASTM No. 2 after the McQuaid-Ehn test, is shown in Figs. 7, 8, 9, 10 and 11. In comparing Fig. 8 with Fig. 10, there is certainly more difference in the surface hardness than would be expected with 10-point carbon difference. The greater difference is to be accounted for by the difference in austenitic grain size at the 1550 deg. F. quenching temperature. The 0.48 per cent carbon steel has a fractured grain size of No. 3.0 and the 0.38 per cent carbon has a grain size of No. 6.5. This illustrates inadvisability of rating the austenitic grain size at 1700 deg. F. When a steel has a coarse grain at 1700 deg. F. it is necessary to also run a test at 1550 deg. F to establish facts relating to its behavior at this lower temperature.



ABOVE

FIG. 7 — Tapered test specimen.

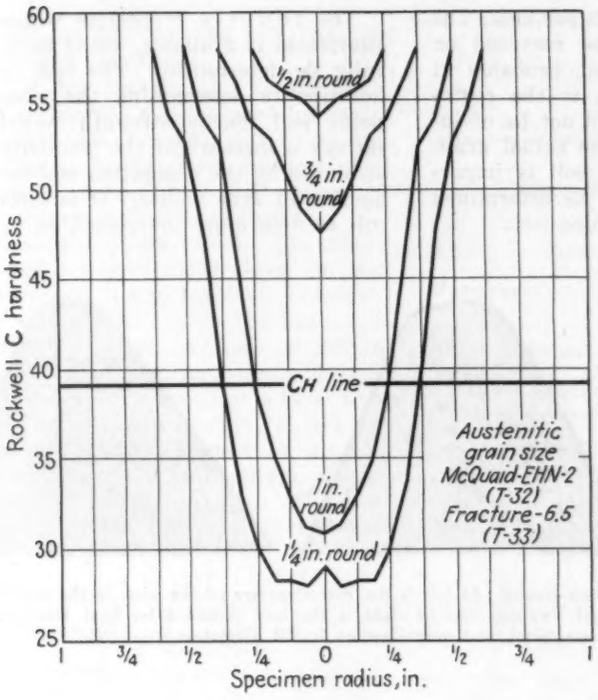


LEFT

FIG. 8 — Surface hardness of an oil and water quenched 0.38 per cent carban steel. The sample was normalized at 1650 deg. F., heated to 1550 deg. F., held 35 min., and quenched in the indicated media.

Figs. 7 to 11 also show that a slight difference in diameter spells the difference in hardening throughout and not hardening throughout. This would translate itself into a difference in tensile strength in a bolt, and, if water quenched, the difference between cracking and not cracking. Fig. 12 shows the appearance of a quench crack in a bolt as distinguished from a seam, which is an original wire defect.

As to actual heat treatment of the medium carbon bolts, the usual hardening temperature is 1550 deg. F. The most modern equipment for hardening includes atmosphere control to prevent scale formation and decarburization. This brings up a very vital con-



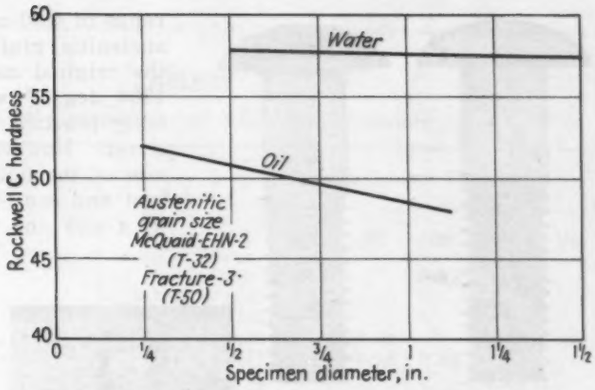
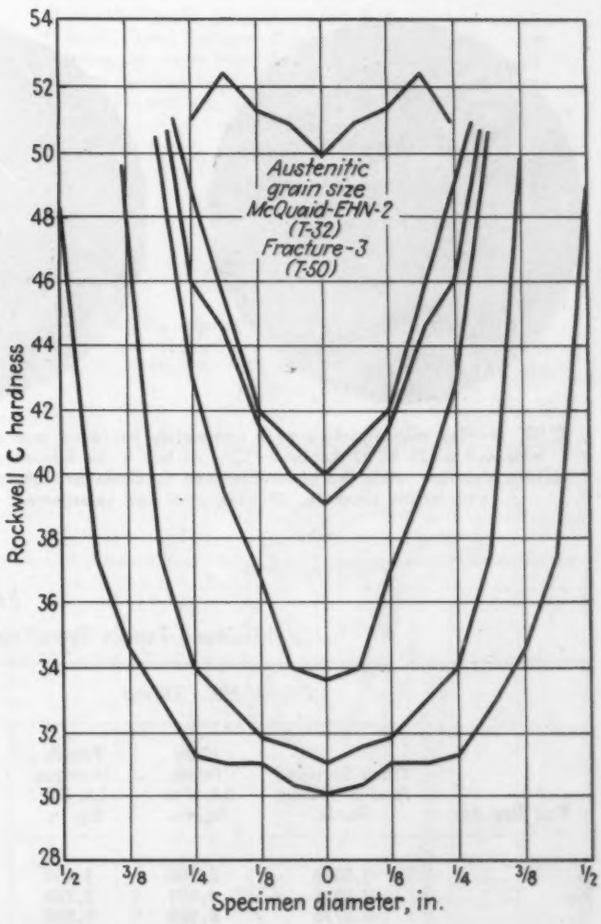


FIG. 10—Surface hardness of oil and water quenched, 0.48 per cent carbon steel. The steel was normalized at 1650 deg. F., heated to 1550 deg. F., held 35 min. and quenched in the indicated media.

o o o



ABOVE

FIG. 9 — Hardness penetration of a water quenched, 0.38 per cent carbon steel. The steel was normalized at 1650 deg. F., heated to 1550 deg. F., held 35 min., and water quenched.

o o o

RIGHT

FIG. 11—Hardness penetration of 0.48 per cent carbon steel. It was normalized at 1650 deg. F., heated to 1550 deg. F., held 50 min., and quenched in oil.

sideration, that of decarburization. Fig. 13 illustrates decarburization of a bolt thread. The amount of decarburization on the wire must be controlled within reasonable limits, those usually specified being 0.008 in. maximum totally decarburized and 0.015 in. maximum total and partial decarburization.

Bolts are quenched either in oil or water with the object to bring the complete cross-section to a hardness of 50 to 55 Rockwell "C". Actually, a complete cross-section hardness will not always be obtained. The microstructures of a completely hardened and an under hardened bolt are shown in Fig. 14.

The tensile specifications on finished bolts are usually given as a minimum for each bolt size and in N.C. and N.F. threads in actual pounds. The reason for this is that an engineer will usually be interested in the safe load capacity of some particular size bolt with an N.C. or N.F. thread. One other reason for this is that there is no general agreement as to the correct area to use in calculating to lb. per sq. in. Metallurgists, however, prefer to have values shown in lb. per sq. in., as they are more familiar with this form. Table III gives the expected minimum tensile values for bolt sizes from ¼ to 1 in. in N.C. and N.F. threads and shows the calculated lb. per sq. in. as well as the areas based on the pitch diameter of the thread. These values can be obtained by tempering from 900 to 1000 deg. F.

Assuming the bolts are now heat treated, it is of interest to note the methods of testing employed to insure the consumer that he has received a satisfactory bolt. The user is not primarily interested in the exact chemical composition of the bolt except to know that it is made from a steel containing carbon within a range of 0.30 to 0.45 per cent and manganese within a

FIG. 12—The quench crack, at left, as distinguished from a seam, at right. Etched in 1:1 hydrochloric acid and reproduced in actual size.

range of 0.60 to 0.90 per cent. The austenitic grain size recorded on the original material, probably at 1700 deg. F. which is the customary practice, would not be of interest. However, the actual grain size of the finished bolt is important and can easily be determined by a nick and fracture test.

The tensile properties where equipment is available, would naturally be determined. The test in addition to determining the yield point and tensile strength would include a measure of the plasticity as shown by the elongation and reduction of area values. It is difficult to determine the reduction of area value but the elongation value is easily determined. However, it is most difficult to set a specification for the elongation value, as it will vary with the length of the bolt and the length of the thread. As a general value, it is required that bolts elongate $\frac{1}{8}$ in. before breaking in the tensile test. This element of the plasticity measurement of the bolt is one of judgment rather than of specification. A skilled tester, by elongation measurement, consideration of the original length and by visual observation of the reduction of area and the type of fracture, will de-

o o o

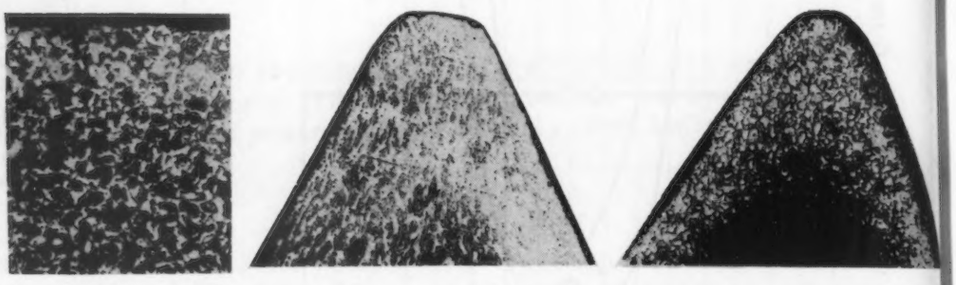


FIG. 13—Decarburization of a bolt thread. At left is the microstructure of the wire, in the center is the bolt thread prior to heat treating, and at right is the bolt thread after heat treating. Etchant used was nital, and magnification is 100 diameters.

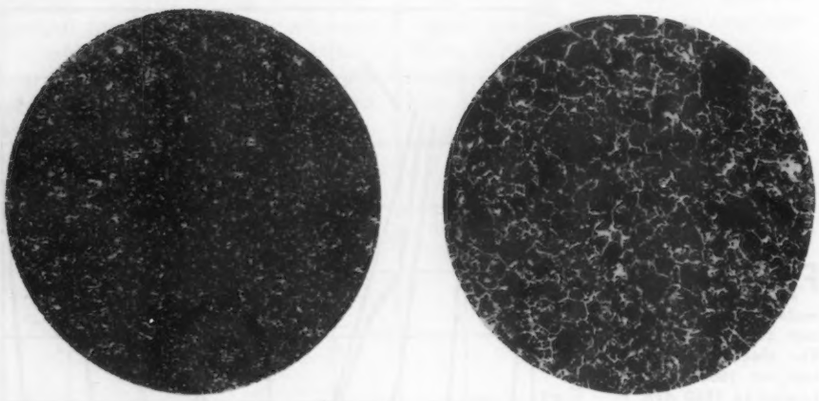


FIG. 14—The microstructure of a completely hardened and an underhardened bolt, tempered to 22 to 32 Rockwell "C". At left is the hardened bolt showing the fine sorbitic structure, while the under-hardened specimen at right reveals a mixed sorbitic and ferritic structure. Etchant, nital and enlargement 100 diameters.

TABLE III

Minimum Tensile Specifications for Medium Carbon Bolts

Bolt Size, In.	Coarse (N.C.) Thread			Fine (N.F.) Thread			Equivalent Unit Strength	
	Cross Sectional Area of Thread, Sq. In.	Yield Point, Lb. Per Sq. In.	Tensile Strength, Lb. Per Sq. In.	Cross Sectional Area of Thread, Sq. In.	Yield Point, Lb. Per Sq. In.	Tensile Strength, Lb. Per Sq. In.	Yield Point, Lb. Per Sq. In.	Tensile Strength, Lb. Per Sq. In.
1/4	0.0318	2,760	3,450	0.0364	3,290	4,110	90,000	112,000
5/16	0.0525	4,630	5,780	0.0580	5,290	6,610	90,000	112,000
3/8	0.0775	6,920	8,650	0.0878	8,140	10,170	90,000	112,000
7/16	0.1063	9,500	11,880	0.1188	10,980	13,730	90,000	112,000
1/2	0.1419	12,760	15,950	0.1600	14,940	18,680	90,000	112,000
9/16	0.1819	16,420	20,520	0.2030	18,980	23,730	90,000	112,000
5/8	0.2260	20,440	25,570	0.2560	24,090	30,100	90,000	112,000
3/4	0.3345	28,430	36,130	0.3730	31,700	40,280	85,000	108,000
7/8	0.4618	37,400	48,200	0.5095	41,300	53,000	81,000	104,000
1	0.6057	49,050	63,000	0.6798	55,100	70,700	81,000	104,000

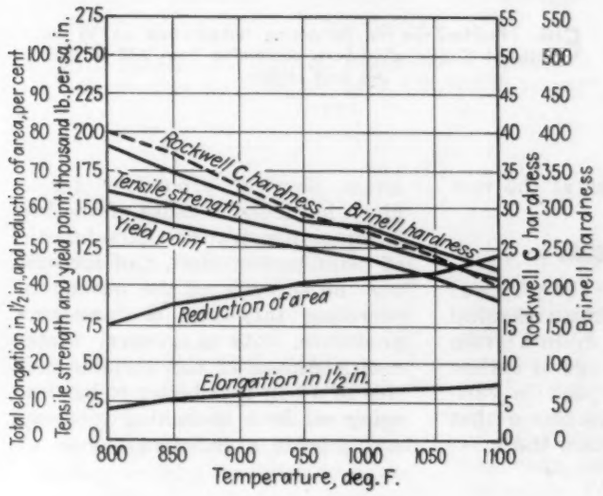
termine whether the bolt has the desired plasticity.

In the absence of a tensile testing machine and the need for rapid inspection, bolts are often inspected by hardness tests. A medium carbon steel bolt correctly hardened will have a Rockwell "C" hardness of 22 to 32. The readings are preferably taken on the threaded end of the bolt. Readings taken on the top of the head will show a Brinell hardness of 228 to 286. This, however, should be supplemented by a bend or a twist test to determine plasticity, a lack of which may be caused by an enlarged grain size or slight cracks in the threaded section. The test methods are described as follows:

TABLE IV

Chemical Composition of Alloy Bolt Materials

Alloying Element	A. I. S. I. No.	Average Content, Per Cent					
		C	Mn	Ni	Cr	Mo	Va
Manganese	C-1041	0.40	1.50				
	A-1335	0.35	1.75				
Nickel	A-2335	0.35	0.70	3.50			
Nickel-chromium	A-3135	0.35	0.70	1.25	0.65		
Molybdenum	A-4042	0.42	0.80			0.25	
Chromium-molybdenum	A-4137	0.38	0.80		0.90	0.22	
Nickel-molybdenum		0.40	0.75	1.20		0.15	
Chromium		0.38	0.60		0.60		
Chromium-vanadium		0.38	0.65		0.90		0.15


Total elongation in 1½ in. and reduction of area, per cent
Tensile strength and yield point, thousand lb. per sq. in.
Rockwell C hardness
Brinell hardness
Rockwell C hardness — Brinell hardness
Tensile strength
Yield point
Reduction of area
Elongation in 1½ in.
Temperature, deg. F.

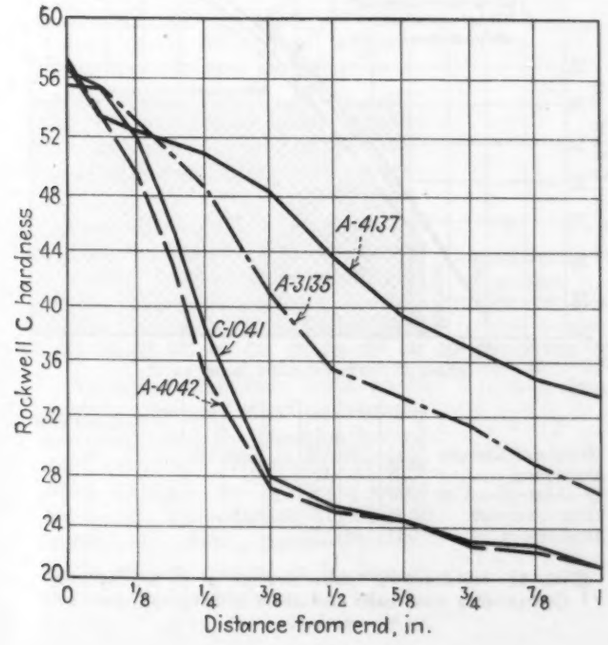
LEFT

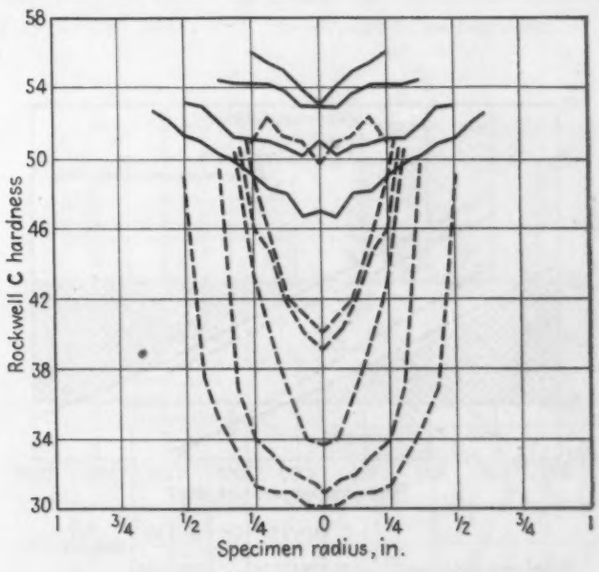
FIG. 15—Tensile properties of a 0.35 per cent carbon steel, ½-in. National Coarse hexagon headed bolts, quenched in water from 1550 deg. F. The "as quenched" surface hardness was 50 to 55 Rockwell "C" and load values, lb. per sq. in., were calculated on an area of 0.1419 sq. in.

o o o

BELOW

FIG. 16—The relative hardness penetration of a carbon steel and a nickel-chromium steel, normalized at 1650 deg. F., heated to 1550 deg. F., held for 50 min. and oil quenched.





LEFT

FIG. 17—Comparative hardenability of four alloy steels used for bolts. Specimens 1-in. round by 3 in. long were normalized at 1650 deg. F., held at 1550 deg. F. for 50 min., and end-quenched in water.

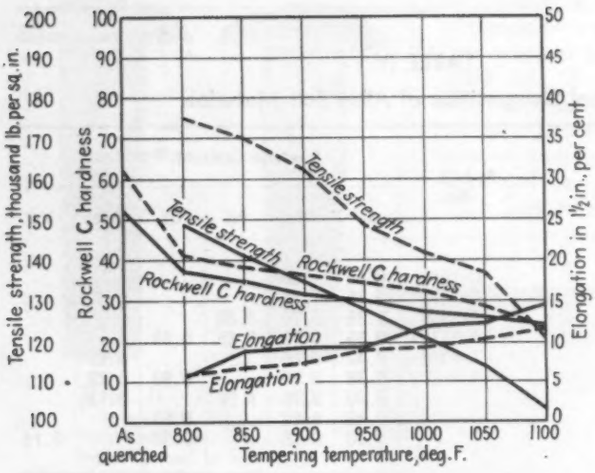
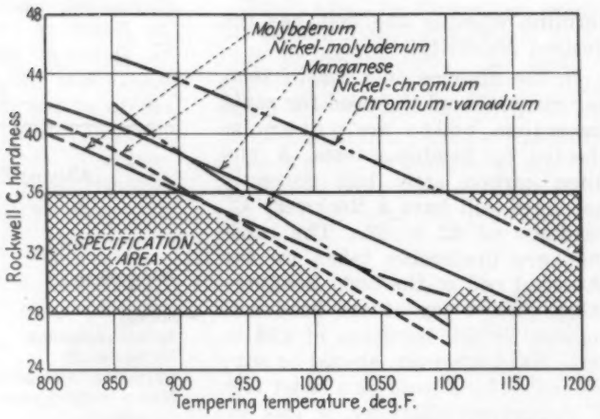


FIG. 18—The effect of carbon content on the tensile properties of ½ in. National Coarse bolts made from nickel-molybdenum steel. The heat treatment consisted of a 20 min. hold at 1550 deg. F., and an oil quench. Tempering was at the indicated temperatures. The load values were calculated on an area of 0.1419 sq. in.



	C	Mn	Si	Cr.	Ni	Mo	Va	A.G.S. McQuaid-EHN
Nickel-molybdenum	0.43	0.62	0.23		0.95	0.12		8
Manganese	0.39	1.61	0.21					2
Chromium-vanadium	0.41	0.73	0.24	1.05			0.21	6
Nickel-chromium	0.38	0.61	0.25	0.62	1.35			7
Molybdenum	0.42	0.84	0.27			0.23		8

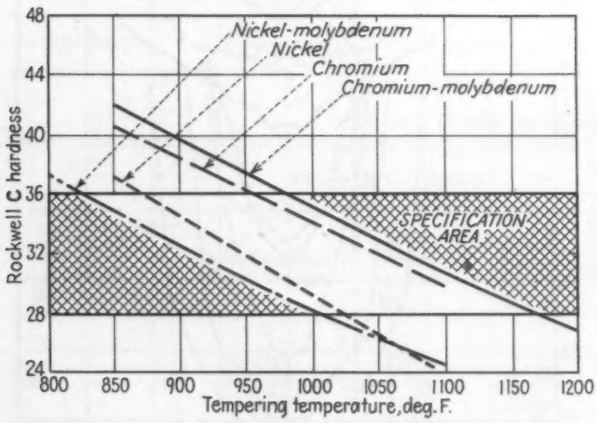
FIG. 19—Hardness vs. tempering temperature on ½ in. National Coarse alloy bolts containing from 0.38 to 0.43 per cent carbon.

(1) Bend Test: Bolts, when held in a vise and hammered, must be capable of bending in the threaded section through an angle of 30 deg. before fracturing.

(2) Twist Test: Bolts shall be gripped in a vise at the top of the thread and a wrench applied to the head with the upper two thirds held in the wrench jaws. The head shall neither fracture nor break off before the bolt breaks at the root of the thread.

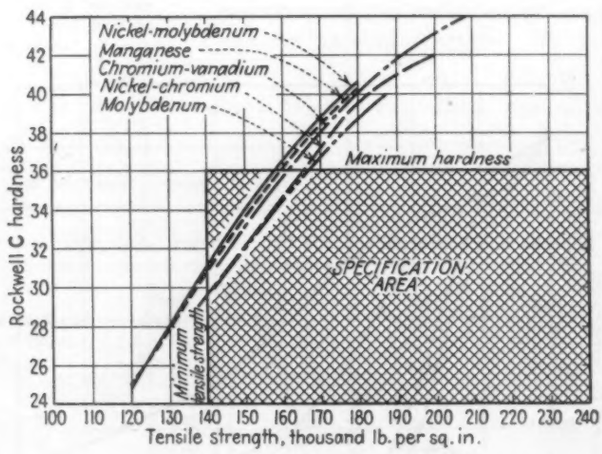
Alloy Steel Bolts

Bolts made from alloy steel should have the maximum physical properties obtainable from a given section. In the coverage of carbon steel bolts it was implied in various points in the discussion that it was difficult to obtain the maximum physical properties for a given hardness, because of the low hardness penetration characteristic of plain carbon steel, and increasing the severity of the quench to overcome this was a dangerous procedure. As a general statement, because of the variable section of a bolt it is better to harden, using oil as a quenching medium, and provide a sufficient degree of



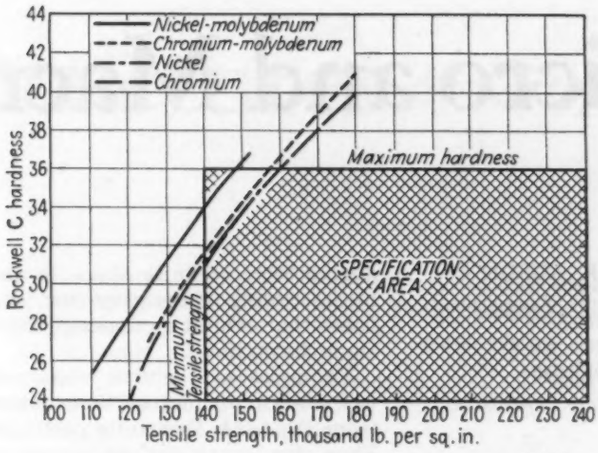
	C	Mn	Si	Cr	Ni	Mo.	A.G.S. McQuaid-EHN
Nickel-molybdenum	0.34	0.63	0.34		0.95	0.08	7
Nickel	0.30	0.66	0.21		3.37		6
Chromium	0.35	0.74	0.20	0.46			3
Chromium-molybdenum	0.35	0.66	0.25	0.81		0.21	7

FIG. 20—Hardness vs. tempering temperature on ½ in. National Coarse alloy steel bolts containing 0.30 to 0.35 per cent carbon.



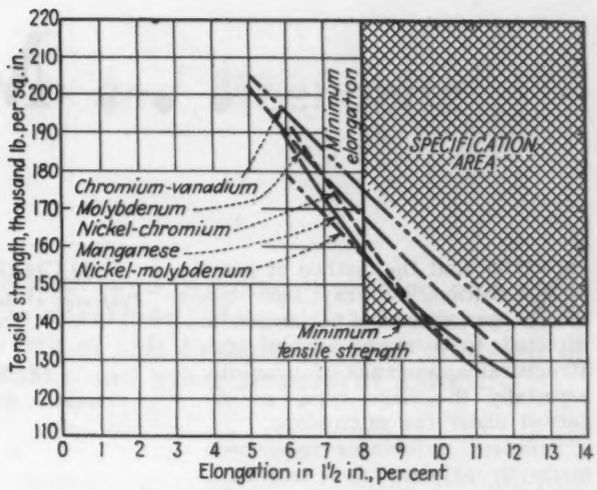
	C	Mn	Si	Cr	Ni	Mo	Va	A.G.S. McQuaid-EHN
Nickel-molybdenum	0.43	0.62	0.23		0.95	0.12		8
Manganese	0.39	1.61	0.21					2
Chromium-vanadium	0.41	0.73	0.24	1.05			0.21	6
Nickel-chromium	0.38	0.61	0.25	0.62	1.35			7
Molybdenum	0.42	0.84	0.27			0.23		8

FIG. 21—Hardness vs. tensile strength of ½ in. National Coarse alloy steel bolts containing 0.38 to 0.43 per cent carbon.



	C	Mn	Si	Cr	Ni.	Mo.	A.G.S. McQuaid-EHN
Nickel-molybdenum	0.34	0.63	0.34		0.95	0.08	7
Chromium-molybdenum	0.35	0.66	0.25	0.81		0.21	7
Nickel	0.30	0.66	0.21		3.37		6
Chromium	0.35	0.74	0.20	0.46			3

FIG. 22—Hardness vs. tensile strength of ½ in. National Coarse alloy steel bolts containing 0.30 to 0.35 per cent carbon.



	C	Mn	Si	Ca	Ni	Mo	Va	A.G.S. McQuaid-EHN
Nickel-molybdenum	0.43	0.62	0.23		0.95	0.12		8
Manganese	0.39	1.61	0.21					2
Chromium-vanadium	0.41	0.73	0.24	1.05			0.21	6
Nickel-chromium	0.38	0.61	0.25	0.62	1.35			7
Molybdenum	0.42	0.84	0.27			0.23		8

FIG. 23—Tensile strength vs. elongation of ½ in. National Coarse alloy steel bolts containing 0.38 to 0.43 per cent carbon.

hardness penetration to insure complete hardening through the section. To fulfill this requirement there is a wide variety of steels available. Table IV gives a fairly complete list of steels that have and could be used.

All steel shown in Table IV will harden by oil quenching to a surface hardness of 50 to 55 Rockwell "C" and harden throughout the section up to ⅝ in. in diamenter. From ⅝ to 1 in., the A.I.S.I. C-1041, manganese steel; the nickel-molybdenum, the A. I. S. I. A-4042 molybdenum; and the chromium analysis may not do so under all conditions. This question of selecting a steel for the bolt size depends on the hardness penetration characteristics of the steel. The relative hardness penetration of a carbon steel and a nickel-chromium steel, oil quenched, is shown in Fig. 16. Fig. 17 gives the comparative hardenability of four commonly used alloy steels.

Assuming that only bolts up to and including ⅝ in. in diameter are considered, the question invariably asked is: "Which is the best alloy steel to use for bolts based on tensile test values?" This is difficult to answer because as far as is known, no one is in possession of enough data to answer the question properly. In the first place, it would be necessary to obtain the alloy steels for test purposes with exactly the same carbon content and hardenability characteristics that would be typical for the particular alloy analysis. This is difficult and the effect of even a 10-point variation in carbon content with the same alloy content is shown in Fig. 18.

An evident difference in the behavior of one alloy steel over another is the effect of the tempering temperature on the hardness and, consequently, on the tensile properties. Fig. 19 shows the effect of temperature on five alloy steels containing 0.38 to 0.43 per cent carbon and Fig. 20 gives the effect on four alloy steels containing 0.30 to 0.35 per cent carbon.

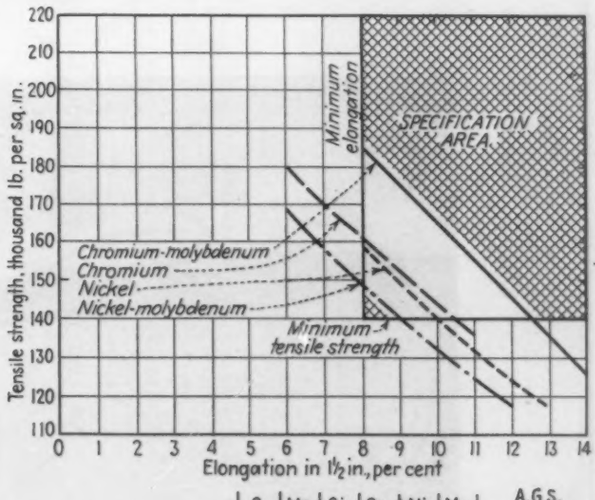
It appears from the previous data that the chromium-vanadium,

(*Concluded on Page* 129)

o o o

FIG. 24 — Tensile strength vs. elongation in ½ in. National Coarse alloy steel bolt containing 0.30 to 0.35 per cent carbon.

o o o



	C	Mn	Si	Cr	Ni	Mo	A.G.S. McQuaid-EHN
Nickel-molybdenum	0.34	0.63	0.34		0.95	0.08	7
Nickel	0.30	0.66	0.21		3.37		6
Chromium	0.35	0.74	0.20	0.46			3
Chromium-molybdenum	0.35	0.66	0.25	0.81		0.21	7

. . . Micro and Macro S

By CHARLES R. AUSTIN
Professor of Metallurgy, Pennsylvania State College
and
M. M. LIPNICK
Meehanite Metal Corp., Pittsburgh

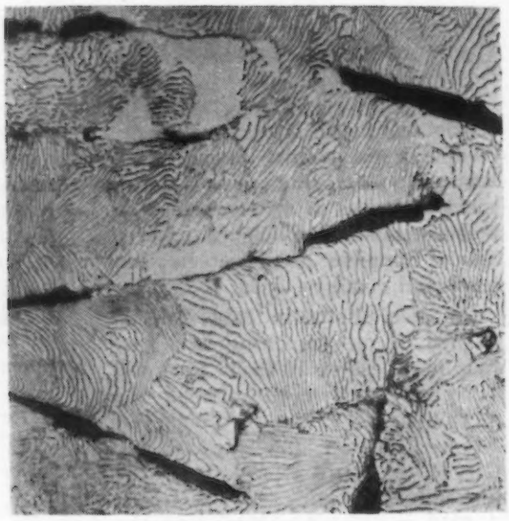
NOW that the method of preparation of gray iron has been discussed, attention is directed to a study of the true structural appearance of graphite, especially the flake type, as observed under the microscope.

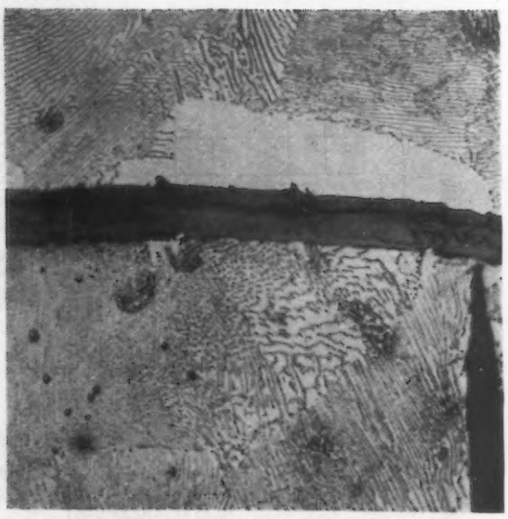
Frequent references have been made to primary and secondary graphite, but terms are so ill-defined that it is not clear as to what exact significance various authors wish to ascribe to these terms.

o o o

Here, it is believed that it has been possible to distinguish between flakes that appear to be homogeneous and which were formed entirely during some definite stage in the initial cooling of the gray iron, and flakes that exhibit an apparent two-stage formation.

Examples of the first class are well shown in microsections taken from Type GA Meehanite castings. Thus, the continuity of structure of the graphite is well illustrated in Fig. 10 from a Meehanite brake drum casting. Similarly, primary graphite can be found in a gray iron as shown in Fig. 11. This





UPPER LEFT

FIG. 10—Etched structure of Meehanite showing the simple primary graphite flakes in a pearlite matrix. 600 diameters.

ABOVE

FIG. 11—Etched structure of gray iron showing the simple primary graphite flakes in a pearlite-ferrite matrix. Also can be observed the fine flake graphite network at the ferrite boundary. Enlargement, 1000 diameters

LEFT

FIG. 12—The continuous envelope of secondary graphite around the primary flake may be observed in this etched gray iron sample, enlargement 1000 diameters.

Structures of Gray Iron and Meehanite

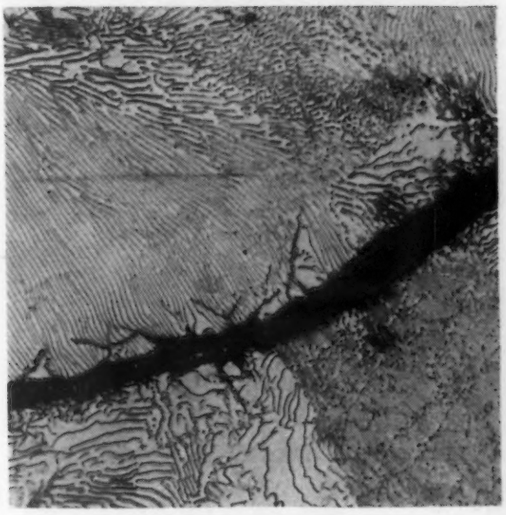
cast iron sample also exhibits a fine graphite net work in the pearlite-ferrite boundary.

An example of what may be termed secondary graphite is illustrated in Fig. 12. On either side of the main or initial primary graphite flake has been deposited a continuous regular film or layer of secondary graphite surrounding and following the general contour of the primary flake. While it is not the purpose here to attempt to correlate specifically the stages of graphite formation with the history of cooling of the iron, nevertheless it seems clear that a differentiation must be made between the two stages of graphite flake development.

. . . Last week an improved grinding, polishing and etching procedure was described. Herein, in conclusion, data are given on the use of this technique in the studying of graphite flakes and other structural details.

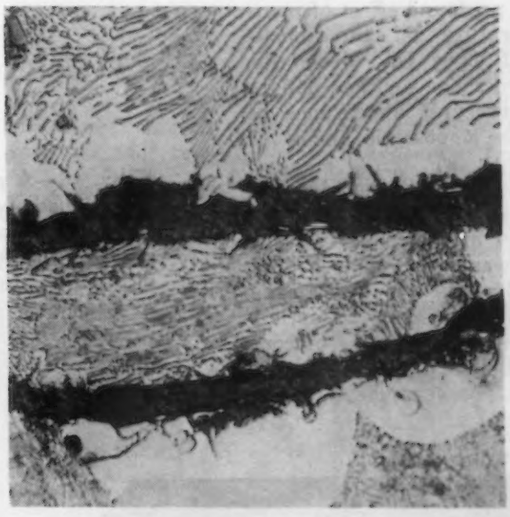
° ° °

Another form of this secondary graphite is pictured in Figs 13, 14, and 15. Figs. 13 and 14 show a



UPPER RIGHT

FIG. 13—An etched gray iron sample showing a fine secondary graphite developing from the primary flake. 1000 diameters



ABOVE

FIG. 14—Another typical combination of primary and secondary graphite in gray iron, enlarged 1000 times.

RIGHT

FIG. 15—Etched gray iron, free from primary flake but exhibiting fine secondary graphite development. Enlarged 1000 diameters.

combination of both primary and secondary graphite, while Fig. 15 exhibits an area completely free from primary graphite flakes but where secondary graphite can be seen distributed among the pearlite grains.

While the science has not been sufficiently developed to permit a direct correlation between the presence, amount and nature of distribution of what has been termed secondary graphite with physical properties, there appears to be evidence to indicate that melting and casting conditions which prevent the formation of secondary graphite also lead to improvement of physical properties of the gray irons. Thus, Meehanite, which exhibits superior high tensile properties, appears to be free from secondary graphite.

Macrostructures of Iron and Meehanite

In an effort to ascertain the reason for the profound effect of pouring temperature on the tensile strength of Type GA Meehanite, studies were made on the changes in macrostructural appearance of the iron as a possible index of properties.

At first, attention was directed to graphite distribution as revealed by low power macroscopy. In these studies it was soon realized that while visual studies could be made satisfactorily using various optical equipment, it was a matter of considerable difficulty to adequately reproduce in photographic form the sort of characteristics that were visually noted. The major problem was found in attempting to reproduce an area of the specimen at low magnification of sufficient size to illustrate significant pattern characteristics and at the same time demonstrate clearly the pattern detail under consideration.

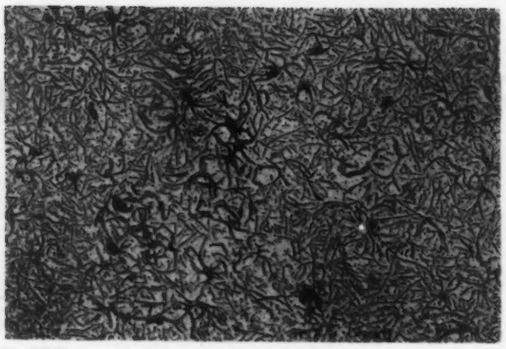


FIG. 16—Polished unetched gray iron section from a truck brake drum showing the coarse graphite flakes, under vertical illumination at 10 diameters.

o o o

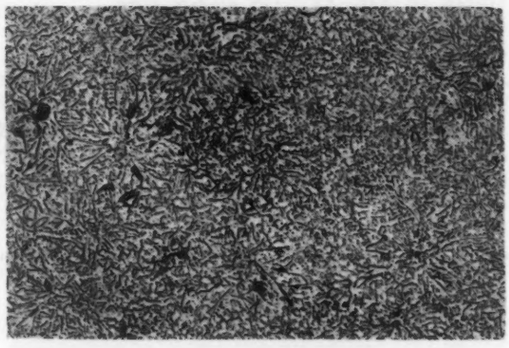


FIG. 17—A polished unetched gray iron section, showing the typical coarse "rosette" and "whorl" graphite formation, vertically illuminated at 10 diameters magnification.

o o o

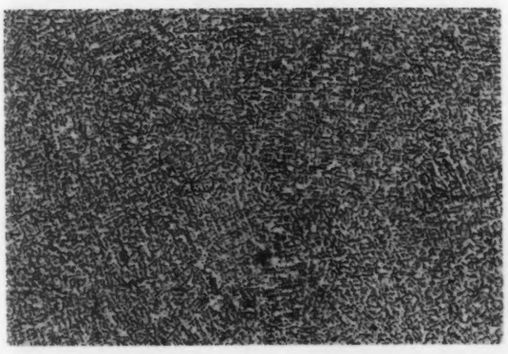


FIG. 18—A polished, unetched Type GA Meehanite section, indicating fine graphite distribution associated with dendritic pattern, under vertical illumination at 10 diameters magnification.

o o o

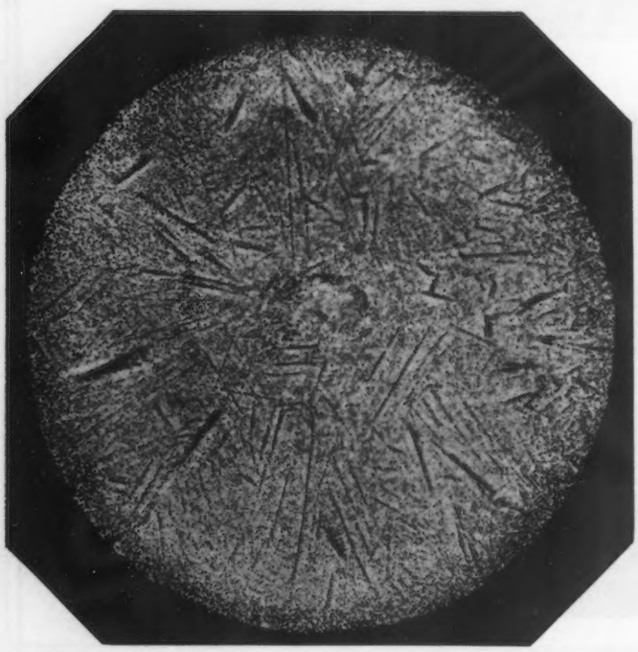


FIG. 19—The development of primary macrostructure in the Type GA Meehanite can be observed here. Using the new etching technique, the coarse, primary, dendritic structure may be noted. Enlargement was three diameters and the tensile strength of the piece is 50,000 lb. per sq. in.

The Bausch and Lomb wide field binocular microscope, using a wide field lamp, affords an excellent means of visual comparison of graphite form and distribution, but this method is not amenable to photographic record. The lamp illuminates a very large field for visual study and by means of its ellipsoidal reflecting surfaces throws light into every recess and eliminates all shadows.

For photographic reproductions of etched sections at magnifications

within the approximate range of 1 to 10 diameters, good results have been obtained by use of suitable Bausch and Lomb micro tessars (6½ in., 72 mm., and 48 mm.) with vertical illumination. The illumination is obtained by interposing a plane glass reflector between the lens and the specimens to be photographed. For reproduction of graphite distribution observed in the unetched samples at about 10 diameters, the optimum condition has been found in utilization of the low power equipment provided with the Zeiss Neophot metallograph, using vertical illumination.

Three typical photographs illustrating the appearance of the polished unetched samples of a gray iron taken: (1) From the rim of a truck brake drum in Fig. 2; (2) from an ordinary sample of gray iron in the laboratory in Fig. 17; and (3) from an arbitration bar of Type GA Meehanite in Fig. 18. These clearly reveal the difference in graphite flake size and distribution. Even at the low magnification of 10 diameters, the "whorl" and "rosette" characteristics of the graphite in Fig. 17 can easily be distinguished from the fine, even, dendritic pattern noted in the Meehanite sample in Fig. 18.

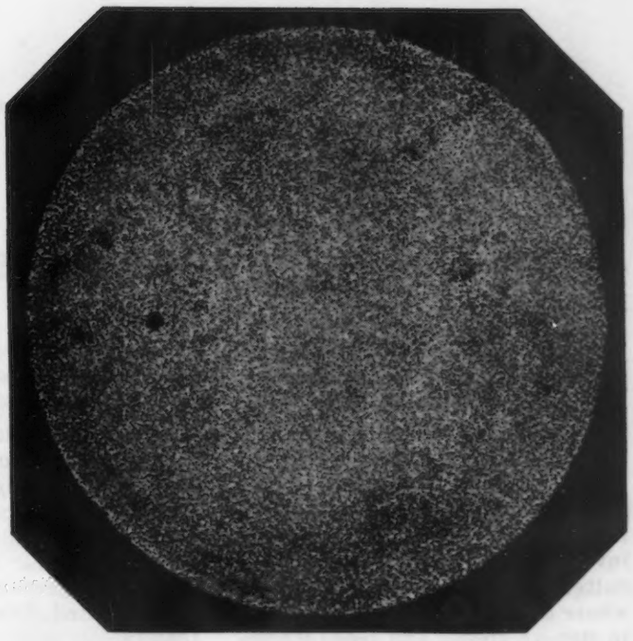


FIG. 20—Here may be noted the fine "macrostructureless" feature of Type G A Meehanite, free from any evidence of a dendritic pattern. Magnification three diameters, and tensile strength 40,200 lb. per sq. in.

In white irons the macro characteristics that can be revealed so readily on simple etching are generally familiar. In a study of the effect of casting temperature on the primary microstructure of white cast irons, Norbury * presents some beautiful reproductions of the etched macrostructures observed at 15 diameters.

* *Journal Iron and Steel Institute, 1939, III.*

In an attempt to make a similar comparison between pouring temperature and etched macrostructure of Meehanite and to correlate the characteristic effects of pouring temperature on macropattern with mechanical properties, a comprehensive study of etching reagents and etching technique on Type GA Meehanite was made. This cast alloy is essentially free from dendritic cementite so that the etching reagents used for white irons are totally ineffective for the development of a macropattern.

Jurick made some suggestions in a paper† on the primary etching of gray cast irons, and presented pictorial reproductions at 40 diam-

(*Continued on Page* 129)

Figs. 21 to 24—Effect of pouring temperature on the etched macro pattern of Type GA Meehanite.

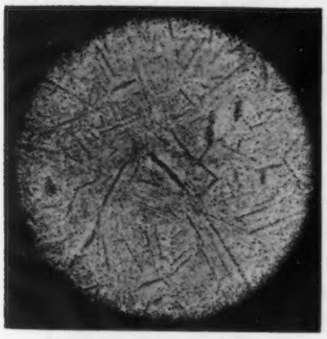


Fig. 21—Poured at 2700 deg. F.

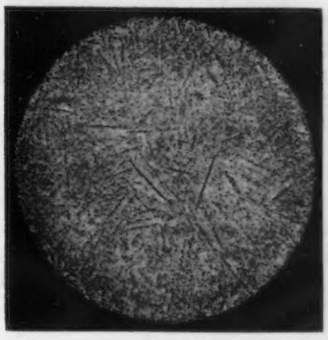


Fig. 22—Poured at 2530 deg. F.

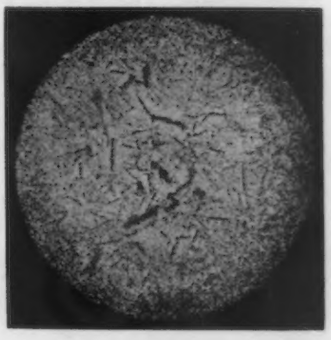


Fig. 23—Poured at 2470 deg. F.

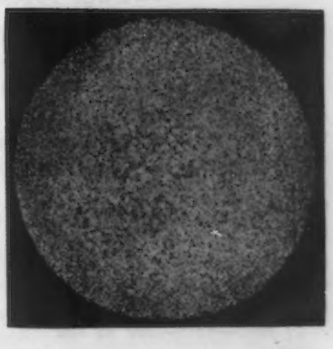
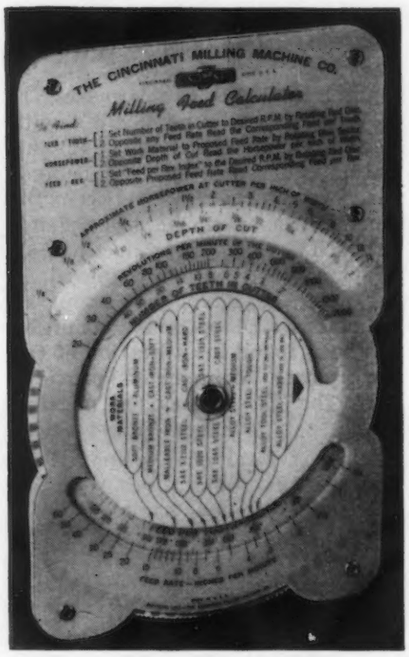


Fig. 24—Poured at 2390 deg. F.

Calculation of Milling Feeds and Speeds



SELECTION of efficient speeds and feeds for milling cutters has been greatly simplified by the calculator illustrated here, which has been devised to correlate the large number of factors involved. The object is to reduce cutter breakage and "burning" where cutters are run too fast, and to step-up speeds and feeds where the machines are run over-cautiously slow.

On one side of the calculator, not shown, the desirable r.p.m. of the cutter and corresponding peripheral speed in ft. per min. are determined by rotating scales, taking into account the diameter of cutter, cutter material (carbon tool steel, high speed steel, or sintered carbide), and the material being cut, including most of the common alloy steels and non-ferrous alloys.

For the selection of the feed rate, the available horsepower is correlated with the most desirable feed per tooth from the point of view of maximum cutter life. The accompanying table shows the feed per tooth for average conditions and is intended as a guide to avoid overloading the cutter. The values must obviously be scaled down where the depth of cut is great, where the overhang of the cutter is considerable or where the cutter or work is fragile in nature. The design and sharpness of the cutter, proportions of cut, uniformity of material, machine condition, etc., should also be taken into account. It should be kept in mind, however, that from the standpoint of productivity, efficiency of metal removal and freedom from chatter, the feed per tooth with any kind of cutter should be as high as possible. With sintered carbide cutters, on the other hand, the feed per tooth must often be reduced below the values given because of limitations imposed by cutter design and power available in the machine.

Using the calculator, the feed rate per tooth is first determined on the assumption that the full power at the tool can be utilized without damaging the cutter and work, taking into account the horsepower available per inch of width, depth of cut, the material being cut, the number of teeth in the cutter and the r.p.m. of the cutter. The feed per tooth is directly translated into feed rate in inches per min., and by an auxiliary scale into feed per revolution of the cutter.

If the feed per revolution indicated is such that the spacing of the revolution marks on the work piece are too wide for proper finish, a new feed rate can be selected and the feed per tooth and the horsepower resulting from this selected feed rate can be worked out by means of the scales.

Because of the large number of calculations that would ordinarily be required in working out feeds and speeds on a scientific basis, this calculator and the accompanying table should be of considerable value in increasing the efficiency of milling operations. The calculator may be obtained from the Cincinnati Milling Machine Co., Cincinnati, Ohio, at 50c. each.

Average Feeds for Milling Various Materials

Material	Feed per Tooth, In. Face Mills	Spiral Mills	Slotting & Side Mills	End Mills	Form Cutters	Saws
Aluminum, soft bronze	0.022	0.017	0.013	0.011	0.006	0.005
Medium bronze, cast iron—soft	0.018	0.014	0.011	0.009	0.005	0.004
Malleable iron, cast iron—medium	0.015	0.012	0.009	0.008	0.005	0.004
SAE X-1112 steel, cast iron—hard	0.013	0.010	0.008	0.006	0.004	0.003
SAE 1020 steel. SAE X-1335 steel	0.011	0.009	0.007	0.005	0.004	0.003
SAE 1045 steel, cast steel	0.009	0.007	0.006	0.005	0.003	0.003
Alloy steel—medium	0.008	0.006	0.005	0.004	0.003	0.002
Alloy steel—tough	0.007	0.005	0.004	0.004	0.002	0.002
Alloy tool steel—250 to 300 Brinell	0.006	0.005	0.004	0.003	0.002	0.0015
Alloy steel—hard—300 to 360 Brinell	0.005	0.004	0.003	0.003	0.002	0.0015

High Speed Steel Tips—
Addendum

IN the article on "High Speed Steel Tips Cemented to Low Alloy Shanks" which appeared in the April 16 issue of THE IRON AGE on page 35, it was mentioned that Cinch Steel Cement is made by W. R. Chapin Co. of Indianapolis. In addition, it should be noted that Cinch Steel Cement is distributed nationally by the Claud S. Gordon Co., 1988 E. 66th Street, Cleveland.

New Equipment . . .

Plant Service Apparatus

This week's news spotlights ventilators, dust collectors and allied equipment. It also covers a number of other plant accessories and includes some additional blackout and air raid precaution material

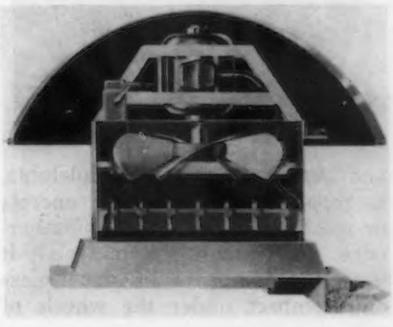
THE Filtaire portable dust collector manufactured by the *Edward Blake Co.*, Newton Centre, Mass., is designed to eliminate the need for exhaust equipment at polishing and dry grinding machines. It is a self-contained unit, powered by a 1/6-hp. motor which moves 1000 cu. ft. of air a minute through the filter. An elbow directs the exhaust toward the ceiling to prevent drafts on other operators. Replaceable filter elements are made of spun glass.

Dust Collectors

A NEW line of self-contained dust collecting units in three sizes has just been announced by *Hammond Machinery Builders*, Kalamazoo, Mich. Filtering capacities range from 275 to 1100 cu. ft. of air per min., and standard inlet sizes are 3, 4 and 5 in. Each unit has three glass fiber filters, and the two large sizes have filter shaking mechanisms so that a large part of the dirt can be shaken into the bottom pan. The air stream in the collectors is directed so that the filters handle only fine dust particles the larger elements dropping into a pan below.

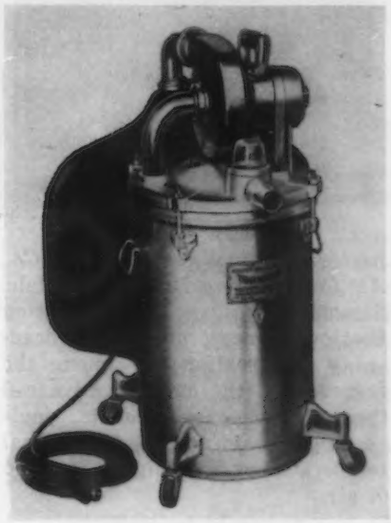
Blackout Ventilators

BLACKOUT type ventilators are now being built by the *Trane Co.*, La Crosse, Wis., in capacities from 1500 to 20,000 cu. ft. of air per min. Three types, summer supply, exhaust and winter supply units are available. Maintenance of the motors which operate the fan and built-in damper is from the roof top, and installation is said to be inexpensive, requiring only a simple curb.



Vacuum Cleaner

THE high rate of speed at which the new Tornado cleaner operates is said to develop sufficient suction strength to pick up welding flux, small scrap, heavy dust particles and other debris. A product of the *Breuer Electric Mfg. Co.*, 5100 Ravenswood Avenue, Chicago, it uses no commutator or carbon brushes. This feature permits it to develop more power and speed, and prolongs its operating life, according to its builders. Operation is from a 220-volt, 180-cycle line.



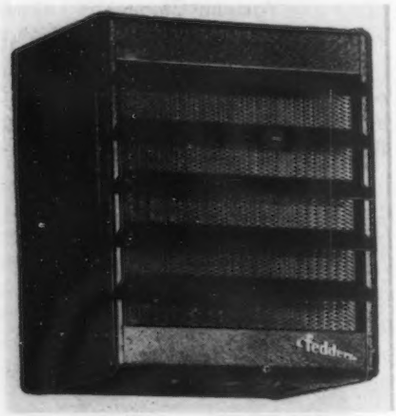
Foundry Heating System

SAID to be a marked improvement over heating systems frequently used in foundries, a recent installation of 10 Thermadjust heat diffusers supplies a magnesium foundry with 135,000 cu. ft. of out-

side air per min. The heating units, products of the *Carrier Corp.*, Syracuse, N. Y., are mounted in an inverted position along the side walls, 9 ft. above the floor level. From long slotted outlets, a low velocity flow of outside air is fanned downward and toward the center of the floor at the correct temperature to offset heat losses through the ventilators. The low velocity air is said to prevent swirling dust and other impurities about the foundry.

Unit Heaters

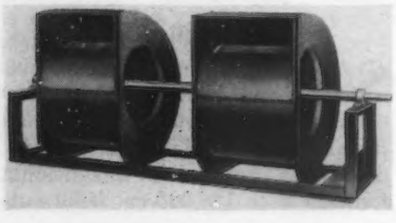
TWELVE models, with ratings ranging from 75 to 1200 sq. ft. equivalent direct radiation, are included in the new line of Lo-Temp



heaters built by *Fedders Mfg. Co., Air Conditioning Division,* Buffalo. Streamlined tubes, a full floating heating element, and sound deadening construction are among the features of the units. Advanced thermal and aerodynamic engineering is said to give lower final temperatures and higher volume of air.

Motor Blower Units

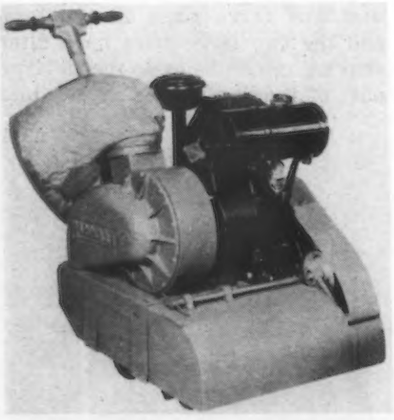
PRODUCTION of motor blower units in a wide range of sizes is announced by the *Niagara Blower Co.*, 6 E. 45th Street, New York. The units are applicable to heating, cooling, air conditioning and similar requirements, and are available in 16 models. These are



built in one, two and three fan assemblies, with capacities from 880 to 42,600 cu. ft. per min. Fan speeds range from 300 to 1750 r.p.m. The blowers may be secured with or without casings, either belt driven or direct connection, and are especially designed for simplified application to duct systems.

Floor Machine

FOR dry cleaning floors in large industrial areas the *G. H. Tennant Co.*, 2576 Second Street,



N., Minneapolis, offers a heavy duty floor cleaner with either electric motor or gasoline engine drive. The units are operated without the use of water or chemicals, and can be fitted with three types of cleaning elements. A steel wire brush is used for oils and greases; sanding drums recondition or level wooden floors; and a steel wool brush is employed for ordinary floor polishing.

Floor Resurfacer

THE new floor patching material, Instant-Use-Resurfacer, produced by the *Flexrock Co.*, 23rd

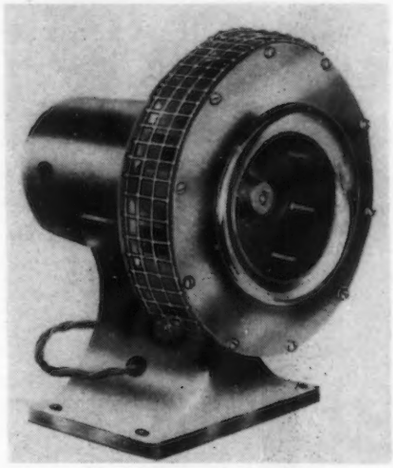
and Manning Streets, Philadelphia, is reported to adhere to concrete or wood, and to bond to a featheredge. A ready-to-use material, it is said to improve in smoothness and compact under the wheels of constant traffic, and to permit trucks to make an easy start after standing on it.

Industrial Floor Patch

SPEED Patch, a new product of the *Rock-Tred Corp.*, 605 W. Washington Boulevard, Chicago, is designed for repairing holes or completely resurfacing floors. The manufacturer states that the application of this ready-mixed cold plastic material requires but a minute on small breaks in floors, and that passage of industrial trucks during installation actually improves the repair job. It will handle any reasonable weight load and is said to provide a safe, low traction, permanent floor repair.

Air Raid Siren

BECAUSE public air raid sirens cannot be heard inside manufacturing plants, private industry may find it advisable to install special warning equipment. *Breuer*



Electric Mfg. Co., 5100 Ravenswood Avenue, Chicago, is producing two types of Tornado sirens for office and plant installation. They are fitted for horizontal or vertical mounting, and operate from a 110-volt line.

Floor Cleaner

PLANT floors which accumulate oil and grease can be cleaned with Speedi-Dri, a product of the *Refiners Lubricating Co.*, 601 W. 26th Street, New York. In addition to its absorbent properties it is anti-skid and non-inflammable. Speedi-Dri is a mineral product of uniform texture which is said to be non-injurious to clothes, metals or painted surfaces.

Blackout Bulb

SPECIFICATION changes as a result of practice tests and OCD recommendations have been effected in the blackout bulb units made by the *Wabash Appliance Corp.*, 335 Carroll Street, Brooklyn. The most important is the change

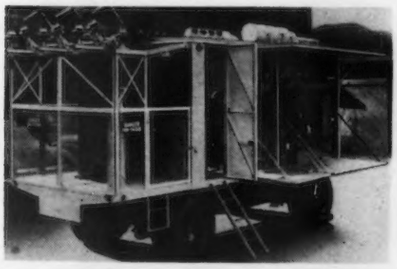
of the light color from blue and red to deep orange. The size is now smaller, the rating has been cut to 15 watts, and the coating improved to prevent light leakage.

Luminous Paint

A LUMINOUS blackout paint has been developed by *Mass & Waldstein Co.*, 438 Riverside Avenue, Newark, N. J. Unlike the radio-active finishes commonly used on watch dials, the new paint owes its luminosity to a substance which re-radiates light. According to the manufacturer, it contains no toxic materials, and a few minutes exposure to electric light or daylight causes it to glow for about 20 hr. Re-exposure repeats the action.

Diesel Electric Power Plants

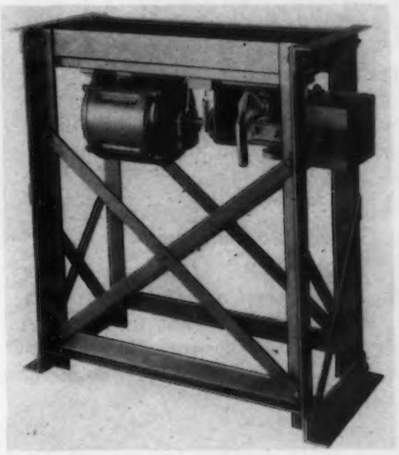
TWO new lines of diesel electric powerplants are now available through the *Ready-Power Co.*, De-



troit. The stationary series consists of eight units, in ratings from 12½ to 50 kw. They are powered by International Harvester diesels, which are started and warmed up on gasoline, and can be hand cranked if necessary. The units are said to be applicable to plants whose power bills run from $100 to $500 per month, where current costs are higher than 2c. per kw.hr. Ready-Power also builds a mobile generating plant which carries two 50-kw. generator sets. This trailer mounted unit is a complete plant, including fuel oil storage tank, a.c. and d.c. station lighting system, transformers and switches. It can be hauled over the road at high speeds by any tractor truck equipped for hauling trailers with vacuum brakes.

Sliding Gate Operator

SLIDING plant gates can be opened and closed by push button control with a new device recently introduced by *Barber-Colman Co.*, Rockford, Ill. The apparatus, supplied in five sizes, provides a chain linkage between an instantaneous reversing type elec-



tric motor. The device is applicable to gates requiring a pull of between 45 and 200 lb.

Plug-In Duct

THE Switch & Panel Division of the *Square D Co.*, Detroit, announces the introduction of a flexible plug-in duct in capacities from 250 to 1000 amp., for two and three-wire single phase, three-phase, and four-wire service. The Saflex duct, which is supplied in standard 10-ft. lengths, accommodates 12 plug-in. units.

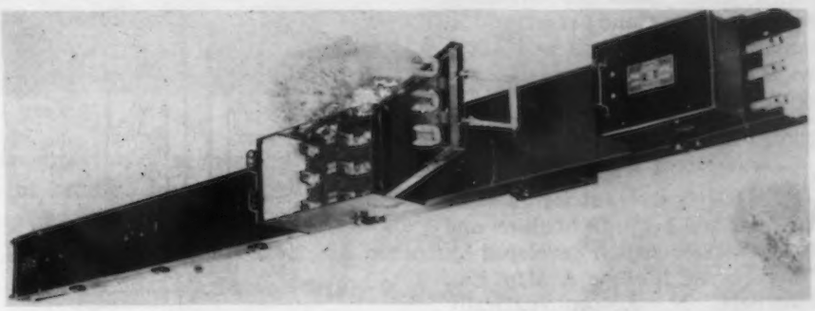
Drum Opener

THE can opener principle is used in the new Westco drum opener, designed to remove the tops of straight-chime metal drums up to

35 in. in height with the same facility as a housewife opens a can of beans. Its manufacturer, *Turner & Seymour Mfg. Co.*, Torrington, Conn., has designed it to replace the hammer and cold chisel method, and fitted it with a counterweight to facilitate handling of the cutter.

Blackout Materials

THE PHILIP CAREY MFG. CO., Lockland, Cincinnati, has developed a line of blackout materials designed not only to cut off



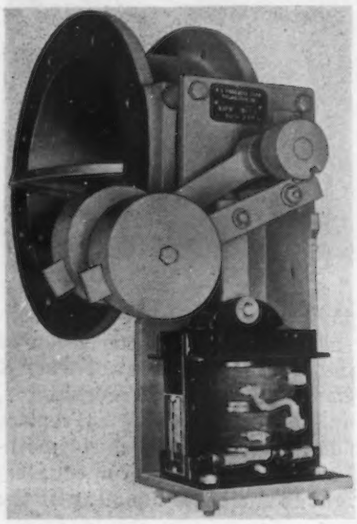
internal light, but to overcome outside reflection and prevent injuries from flying glass. Included are blackout board of laminated asphaltic composition, blackout paints and papers, and a system of camouflage.

Pipe Condensation Arrester

THE plastic cork coating produced by the *J. W. Mortell Co.*, Kankakee, Ill., has been improved so that it can be applied with a paint brush. Designed for application to water pipes or other surfaces where condensation is present, it acts as a protective coating which not only stops dripping, but is said to prevent rust formation.

Butterfly Valve

TWO-POSITION control on a new butterfly valve is claimed to be particularly important today because it can be pre-set either for



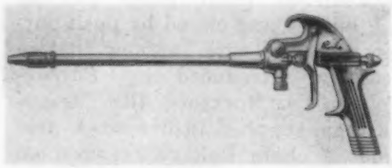
automatic opening or closing in the event of electric power failure. Solenoid operated, it is made by *R-S Products Corp.*, 4530 Germantown Avenue, Philadelphia. The solenoid operates to release a trigger which holds the valve in a given position, and resetting is manual. Various sizes and alloys are available for steam, gas and liquid service.

Fluorescent Light Switch

WHEN fluorescent lights wear out and begin to blink on and off, the starter switch developed by *Westinghouse Electric & Mfg. Co.*, Bloomfield, N. J., automatically ends their life. The switch is designed for use with 40-watt lamps and is interchangeable with present FS-4 two-contact switches.

Cleaning Gun

A NEW cleaning gun for spraying kerosene type cleaning fluids, like Varsol, is being offered by the *Binks Mfg. Co.*, 3114 Carroll Avenue, Chicago. It is fitted with



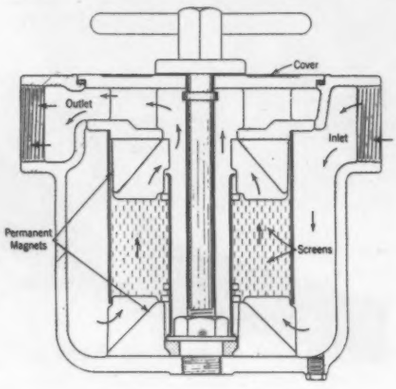
adjustable material control and an adjustable nozzle, and has a ¼-in. standard pipe thread air connection. The gun uses approximately 4 cu. ft. of air per min. at a pressure of 40 to 50 lb. per sq. in., and can be operated with a quart siphon cup or with a suction hose running into an open container.

Blackout Paints

ENGINEERS of the *Reilly Tar & Chemical Corp.*, Indianapolis, point out that an effective blackout requires protection against reflected outside light from moon, stars, fires and flares—as well as complete stoppage of inside light. They offer several paints designed to do both these jobs; that recommended for application to glass is said to be opaque and waterproof, yet easily removed when required.

Pipe Type Magnetic Separator

S. G. *FRANTZ CO.*, 159 Grand Street, New York, has developed a permanent magnet Ferro Filter, which is said to have a greater capacity than any of their previous filters of this type. It is



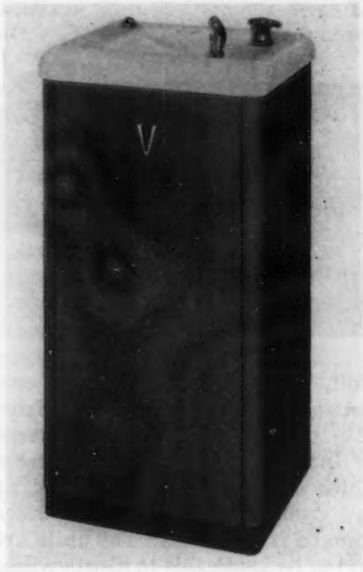
especially adapted to removal of fine iron and steel particles from the coolant systems of machine tools, and the lubricating systems of diesel engines and heavy machinery. It is rated at 200 g.p.m. and has 3-in. pipe connections.

Cement-Asbestos Pipe

THE UNITED STATES STONEWARE CO., Akron, Ohio, has introduced a new line of cement-asbestos pipe and fittings. Standard Roxite pipe is recommended for mildly corrosive solutions and for handling fumes and gases in ventilating ducts and stacks. For higher corrosive and abrasive resistance there are two kinds of lined pipe. The heavier type is suitable for almost all corrosive chemicals with the exception of glacial acetic and concentrated sulphuric acids and chlorinated solvents. Standard sizes run from ¾ to 8 in. i.d., and special sizes to 12 in. i.d. can be secured. Working pressures up to 150 lb. per sq. in. can be used when the pipe is deaired.

Water Cooler

THE new line of Oasis drinking water coolers offered by the *Ebco Mfg. Co.*, Columbus, Ohio, has been designed, according to the manufacturer, to employ the minimum practical amount of strategic metals. It is also claimed that the



coolers deliver an unusually high volume of water for their size. Six models and a number of accessories are available.

Special Multiple-Spindle Milling Machine

This special 7-spindle machine was designed by our engineers for the mass production of saddles for Milwaukee Milling Machines . . . a higher degree of accuracy was obtained than by previous methods . . . and production was increased 350 per cent.

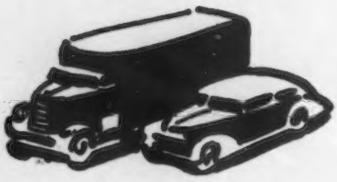
KEARNEY & TRECKER CORP., MILWAUKEE, WIS., U. S. A.

KEARNEY & TRECKER CORPORATION
Milwaukee
MILLING MACHINES

Milwaukee MILLING MACHINES

Assembly Line . . .

• Chrysler report shows progress of auto industry's conversion to war implement production . . . Oldsmobile delivers guns months ahead of schedule . . . Buick to train mechanics for Army Air Force.



DETROIT — Chrysler's first quarter report and information revealed by K. T. Keller, president, to Chrysler directors give evidence of the swelling production of war goods and the near-completion of a gigantic program of converting automotive plants from their normal peacetime roles to one as a major supplier of a great variety of military equipment.

"At the end of 1941," Keller stated, "we were four months ahead of our original tank schedule. In the first four months of 1942 we not only produced twice as many tanks as in all of 1941, but at the same time made plans to expand our production and change tank models.

"During each of the last three months we practically tripled our 40 mm. anti-aircraft gun production and last month we were 39 per cent ahead of our government promises. If material or machinery shortages do not hinder us, our production of guns should double again by July 1.

"Production on 21 other major war contracts of Chrysler Corp. is proceeding rapidly. We have just changed models of Army trucks and our volume on these new vehicles is rising constantly. As more and more machinery and materials arrive, our production of a wide variety of ammunition will continue to increase. At the present time in one plant alone our monthly unit production of ammunition is in seven figures.

"Our bomber fuselage manufacturing is proceeding rapidly. Two assembly lines are already in operation and more are being filled."

Mr. Keller declared that 78 per cent of Chrysler automotive machinery is being used or is being prepared to be used for war work. More than 20 million square feet of floor space in 19 plants will be used.

Keller cited instances in which automotive engineers have been able to devise savings in machine and time on war work. In one operation at the tank plant an automobile production machine was used, thereby releasing six other machine tools for another war job. In an operation on the tank engine, three rotary milling machines, used in auto production days, were adapted so no new machines were necessary.

On one part of the anti-aircraft gun being made by Chrysler, an engineer suggested one change which increased production 800 per cent, eliminated necessity for buying six machines, and saved 30 lb. of critical material on each gun (apparently as reference to a case in which milling machines were eliminated and stock removal greatly reduced.) On another part of the gun an engineering change eliminated 11 lb. of aluminum and 20 lb. of lead. In still another instance a change in type of fixture and machine increased production 300 per cent and saved more than $168,000 on equipment.

Chrysler has recently moved three machines from the Plymouth cylinder block line to the Chrysler Jefferson plant where they are now being used to machine crankcases for tank engines. The Newcastle plant supplied three drills which formerly were used to make steering knuckles, and the drills are now being used on tank engine parts. At the same time, Dodge Main plant supplied 20 screw machines to the Newcastle plant to make shell cores.

General Motors, which has made frequent reports of its progress on the war goods production it has undertaken says in its quarterly report that during the first three months of the year nearly 60 per cent of the corporation's total outside sales represented war materials in various categories, compared with 9 per cent in the corresponding quarter of a year ago. As a matter of fact, some of the commercial products sold by GM and its subsidiaries went into the war effort, too, although this doesn't show up in these figures.

Oldsmobile has just completed its first year of the manufacture of guns—that is, the first year since the letter of intent on the gun contract was received by Olds. On the anniversary date Olds had completed shipment of all the guns specified on the original contract and was continuing to deliver guns months ahead of schedule. In the words of S. E. Skinner, general manager, the plant at Lansing "is knocking a hole in the roof" to start new production curves.

On the original schedule was asked to produce the first weapon 30 days after the scheduled delivery date on its last machine tool. Actually, it produced the first gun several months before the last machine was in the line. To do this Olds farmed out 129 of the total of 132 parts on the gun, undertaking in its own plant only the production of three major parts of the gun.

General Motors Truck and Coach, which is the largest builder of six-wheeled drive trucks for the Army, has instituted a new service program to train soldier mechanics to be stationed at practically every important Army camp in the United States. This six-wheel drive GM truck is designated as the Army's basic truck. Incidentally I. B. Babcock, president and general manager, explains that the designation "6 x 6" means that all six wheels of the truck drive it. There has been a lot of questions in the minds of civilians about the designations 4 x 4, 6 x 6, or 4 x 6. The numbers simply designate the number of wheels, and the number of driving wheels in each instance. On the 6 x 6 there is a front axle de-clutching device that permits the front axle drive to be disengaged when operating on hard surfaced roads, and this is the general practice in designing cars which have front wheel drive available in addition to rear wheel drive. The six-wheel vehicle can have three power-driven

SOMEWHERE IN AMERICA *right now*

P&W Photo—Unretouched

WHEN do you read your industrial paper? What time is it now . . . 10 a.m.? 10 p.m.? 2 p.m. Sunday? *No matter what time the clock says, the P&W cutter you see above is slicing away at a similar crankcase right now.*

Somewhere in America, this P&W precision milling cutter is neatly shaving an aircraft engine case down to design size . . . sending the clean chips flying . . . getting more and still more engines into planes for our other Kellys.

Typical of P&W products, this cutter has the fine accuracy and tough stamina to build America's war strength 24 hours a day. You'll find the same quality . . . ability to stand up on the job . . . in P&W taps, dies, end mills, reamers, and cutters of every kind.

What time is it? What day is it? Who cares?

Just put the pressure on; your P&W tools can take it.

PRATT & WHITNEY

Division Niles-Bement-Pond Company

WEST HARTFORD • CONNECTICUT

axles and 10 tires on the ground, or 12 tires when dual front wheels are used in addition to dual rear wheels on each axle.

The role being played by military trucks is certainly an important one. The big 6 x 6's are the most versatile of all, being used as general purpose vehicles, cargo carriers, gasoline tankers, prime movers for 75 mm. field guns and 105 mm. howitzers, as transportation units to move cavalry horses, by the engineers for mounting air compressors, by anti-aircraft units for hauling sound detectors and searchlight equipment and by the chemical warfare service for hauling oil for smoke screen "smudge pots." Other trucks of this type have water purification equipment mounted on them and still others are used as mobile machine shops or small arms repair units in the field.

Mr. Babcock has also disclosed some of the problems in shipping this type of equipment to foreign ports.

"All parts are prepared for export shipment because we have no way of knowing in advance their ultimate destination," he said. "All trucks for export are first completely built up and actually tested under operating conditions. Then they are knocked down and boxed, two units to the pack for shipment."

One of the most recent training schools started by an automotive plant is one by Buick which will train mechanics for the Army Air Forces. The first group of enlisted personnel will enroll on May 18 and additional groups will be enrolled each week in increasing numbers. The men will be schooled in tearing down and rebuilding air cooled engines and will devote 75 per cent of their school time to actual work on 22 Buick-built aircraft engines and 13 sets of sub-assemblies.

FORD MOTOR CO., through Harry H. Bennett, personnel director, issued a demand Sunday night for the freezing of wages of all Ford workers for the duration of the war. The demand came 24 hr. after the UAW-CIO had asked a flat $1.00 a day wage increase for all Ford workers just as it has asked in the case of General Motors and the steel industry.

Coupled with the Ford demand for wage freezing was a threat that the company might refuse to continue the check-off system for union dues. Bennett cited as Ford's premise that wage increases would boost the cost of war materials to the government "the sole customer of Ford Motor Co. at the present time.

ARMOR PLATE: Continuous production of 95,000 lb. slabs of armor plate like this one, rolled on the world's largest plate mill, the 206-in. mill at Lukens Steel Co., is one of the reasons that the company received recently the Navy "E."

Magnus Organizes New Machine Division

• • • **The organization of a machine division** for the manufacture of mechanical metal washing machines, pickling machines, driers, ovens and burnishing equipment, is announced by the Magnus Chemical Co., Inc., Garwood, N. J. The Magnus organization is a manufacturer of cleaning materials, industrial soaps, metallic soaps, sulfonated oils, emulsifying agents and metal working lubricants.

The new machine division will be under the direction of Marcel Zinty, former general manager of the Magnus European factory.

Compressor, Electroplating, Instrument Committees Named

Washington

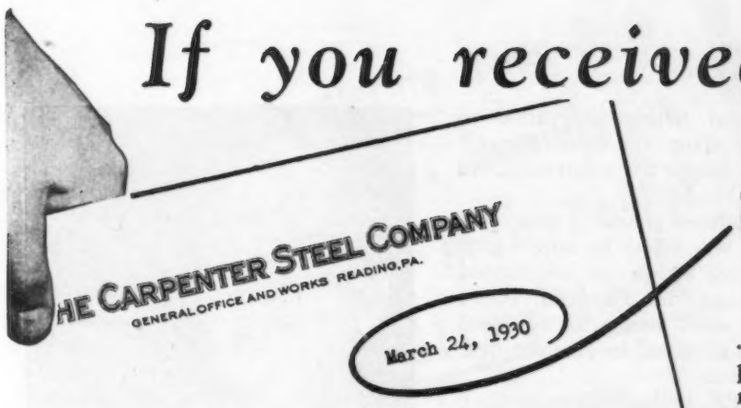
• • • **The following** advisory committees have been announced by T. Spencer Shore, chief of WPB's Bureau of Industry Advisory Committees:

Electroplating—Gustave Cropsey, president, Gustave Cropsey, Inc., New York; Fred Pierdon, president, Art Metal Finishing Co., Washington; Stan White, president, Cadmium & Nickel Plating Co., Los Angeles; H. Ochs, president, Economy Plating Co., Cleveland; B. G. Daw, president, LaSalco, Inc., St. Louis; T. W. Kirby, president, A. T. Wagner Co., Detroit; V. W. Todd, president, Hanson Van Winkle-Munning Co., Matawan, N. J.; Erwin Sohn, American Radiator & Standard Sanitary Corp., Louisville, Ky.; and L. K. Lindahl, president, Udylite Corp., Detroit. Robert Beatty, Section Chief in the Consumers' Durable Goods Branch, is the government presiding officer.

Large Compressor (300 hp. and up)—J. F. Huvane, manager, Compressor Dept., Chicago Pneumatic Tool Co., New York; J. B. O'Connor, vice-president, Clark Bros. Co., Inc., Olean, N. Y.; T. F. Hudgins, vice-president, Cooper-Bessemer Corp., Mt. Vernon, Ohio; E. F. Schaefer, vice-president, Gardner-Denver Co., Quincy, Ill.; M. C. Davison, vice-president, Ingersoll-Rand Co., New York; J. M. Dolan, manager, Compressor Dept., Sullivan Machinery Co., Michigan City, Ind.; Edwin J. Schwanhausser, vice-president, Worthington Pump & Machinery Corp., Buffalo; and Frederick Pope, Chemical Construction Corp., New York. William K. Frank is government presiding officer.

Industrial Instruments—E. B. Evleth, vice-president, Brown Instrument Co., Philadelphia; R. A. Schoenfeld, vice-president, Wheelco Instruments Co., Chicago; E. M. Jones, general manager, Simplex Valve & Meter Co., Philadelphia; Barton Jones, president, Morey & Jones, Ltd., Los Angeles; H. Merrill, general manager, Manning, Maxwell & Moore, Inc., Bridgeport, Conn.; Paul A. Elfers, vice-president, Fisher Governor Co., Marshalltown, Iowa; H. C. Mueller, Powers Regulator Co., Chicago; J. V. Geisler, president, Fulton Sylphon Co., Knoxville, Tenn.; L. B. Swift, president, Taylor Instrument Co., Rochester, N. Y.; L. G. Wilson, president, Precision Thermometer & Instrument Co., Philadelphia; P. T. Sprague, president, Hays Corp., Michigan City, Ind.; C. S. Redding, president, Leeds & Northrup Co., Philadelphia; George Hendricks, vice-president, Republic Flow Meters Co., Chicago; and Rowland Hazard, vice-president, Bristol Co., Waterbury, Conn. Charles L. Saunders is government presiding officer.

If you received this letter


HE CARPENTER STEEL COMPANY
GENERAL OFFICE AND WORKS READING, PA.
March 24, 1930
Gentlemen:
May we have your cooperation?
We have prepared some very interesting and informative bulletins on the use of tool steels, and we would like to direct these bulletins to the attention of the men in your plant who buy and use such tools.
They will find the bulletins helpful not only as a guide for economical purchase but in the design, heat treatment and use of their tools.
write on the enclosed card the names men in your organization as an aid

in March, 1930 . . .

. . . you were among the first to hear of Carpenter's program of *All Aid to Tool Steel Users.* Today, many years of experience enable us to provide a vital wartime service—helping to boost production and conserve precious tool steel.

Literally thousands of tool room supervisors and tool engineers have used this program. Reports from many plants show that Carpenter cooperation and assistance have been doing a lot to help . . .

step up machine output
conserve valuable metals
avoid hardening troubles
get longer tool life
train new men on the job
cut tool and production costs

If you can use help to accomplish those things—here is a program backed by years of research and experience in tool rooms and production plants.

As an immediate starter, we offer "Tool Steel Simplified". This handbook is being used in tool rooms, heat treating departments and machine shops to make every pound of tool steel contribute its share to *faster production.* It can help train apprentices faster. It can act as an excellent "refresher course" for the tool maker, while providing a useful reference source for tool engineers.

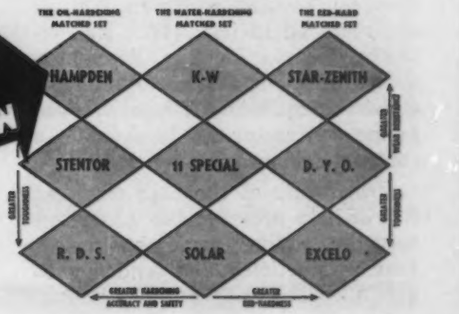
This handbook can help you overcome tool room problems *now,* and if at any time you are faced with a new problem, remember that the services of your nearby Carpenter representative and our Metallurgical Department are at your disposal.

Over 25,000 copies of "Tool Steel Simplified" are helping to produce *better tools* that will do the jobs *more quickly.* It answers common questions on *eliminating tool warping, avoiding grinding checks* and *making tools wear longer.* Three chapters on heat treating procedure, and others on such subjects as "Trouble Shooting" and "The Relation of Design to Heat Treatment", make this 315-page handbook *must* reading for every man responsible for tools. "Tool Steel Simplified" is offered at cost—$1.00—to tool steel users in the U. S. A. ($3.50 elsewhere). After you have read it, you will want more men in your plant to have copies.

THE CARPENTER STEEL CO.
READING, PA. DEPT. 101

Carpenter MATCHED TOOL STEELS

IMPORTANT, BEFORE . . . VITAL NOW



Washington . . .

• WPB considers country-wide adoption of Stanley Plan, a system of spreading war work to subcontractors according to a code . . . Seen as way to keep small companies in business.

WASHINGTON—Prime contractors in Indianapolis and Chicago, working on munitions production, have been experimenting with a system for spreading war work through subcontracting machine tool jobs. This system is known as the "Stanley Plan," and WPB is considering establishing it on a nation-wide basis, especially since the tests are said to be successful by those who conducted them.

The "Stanley Plan," named after its originator, James S. Stanley of the WPB Production Division, is a directory of machine tool subcontracting opportunities. The prime contractors list the types of machines, materials, end product, machine and man hours, and operations necessary to make the end production, according to an alphabetical code. Subcontractors, applying the code to the machines in their shops, are able to tell whether they can qualify and manufacture the required article. If a subcontractor thinks he can do a job measured by the directory, he requests blue prints. If he shows the prime contractor he is capable, a contract follows.

Proponents of the plan say that it will help preserve the American way by saving small businesses from extinction. The tendency to give all business to larger concerns, it is argued, brings the threat of monopoly after the war thereby making it easier for government to regiment.

It is claimed that the plan will speed the war effort because every idle machine which can be utilized saves money in material costs, hours of work and scarce alloys, which are required to produce new machine tools.

One WPB spokesman said that subcontracting would speed production. He declared that it would aid labor because of the greater spread of work, and consequently more communities would be benefited than if no subcontracting was organized on a national scale. Some subcontractors are said to favor the plan because it will save them time in finding jobs, and from being forced to read numerous blue prints in search for jobs their shops can handle.

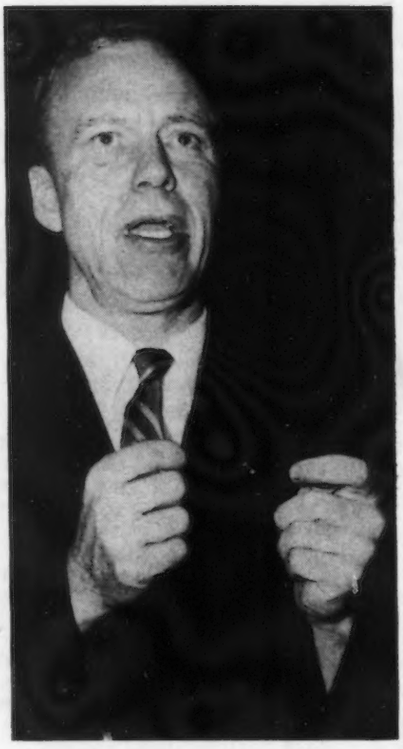
ON the other side of the question, are those who insist that subcontracting increases costs. The reason given is the claim that many subcontractors lack experience in production of the comparatively new lines of war products. OPA has recognized this factor in allowing exceptions to machine tool price schedules, and has revised prices upward in quite a few instances.

The Stanley directory, while it is not impossibly complex, would conceivably lead to mistakes in contracts if tools or contracts were not properly coded. Manifestly this would lead to litigation in some cases, and most certainly would waste time.

Some prime contractors say that they doubt if a great percentage of subcontractors would accurately fill specifications, and that quite a number are not financially responsible. These same business men further say that it takes a trial to discover whether a subcontractor is reliable, and if the trial proves he is not—then the prime contractor would have the added cost of doing the job over again.

THE first table in the directory is called the Machine Code. Each of the following is assigned a triple letter code symbol, alphabetically: boring, drilling, lathes, milling, planers, shapers, slotters, broaching, keyseating, gear cutting, grinding, honing, lapping, polish and buffing, filing, cut off, threading, shearing, punch presses, bending, riveting, welding, shop equipment, and miscellaneous. Standard machine types and sizes are likewise coded. For example, a 24 in. vertical boring and turning machine, one turret head on rail, is coded AAA; 30 in. is AAB; 36 in. AAC, etc. One turret and one plain swivel head, of 42 in. is assigned the code letters BAA.

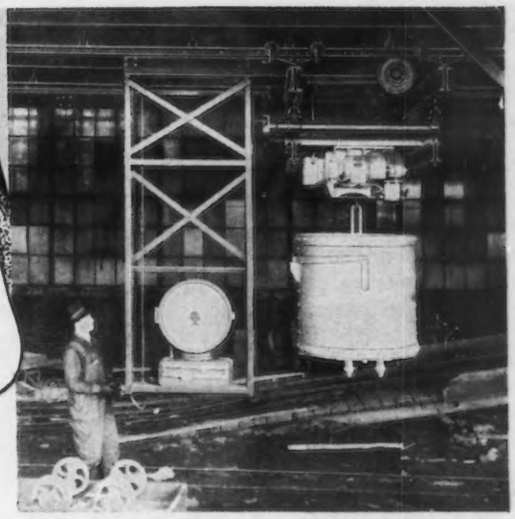
A subcontractor codes the machines in his shop alphabetically. Let it be assumed that he has a 36 in. vertical boring and turning machine, side head and turret rail head; a 16 in. drilling machine, sensitive box column, one spindle No. 2 Morse taper; a radial plain drilling machine 5 ft. x 13 in., arm length and column; tool room pre-



Harris & Ewing Photo

COMMISSIONS FOR CIVILIANS: Undersecretary of War, Robert Patterson, told House Military Affairs Committee members that the Army's supply and distribution system would have "utterly broken down" if experts in thousands of technical fields could not have been commissioned directly from civil life without going through military training proposed by the committee.

You Can Accelerate Your Rate of Production as Rapidly as You Release Man Power from Handling Labor



Power operated charging crane with built in scale and electric hoist.

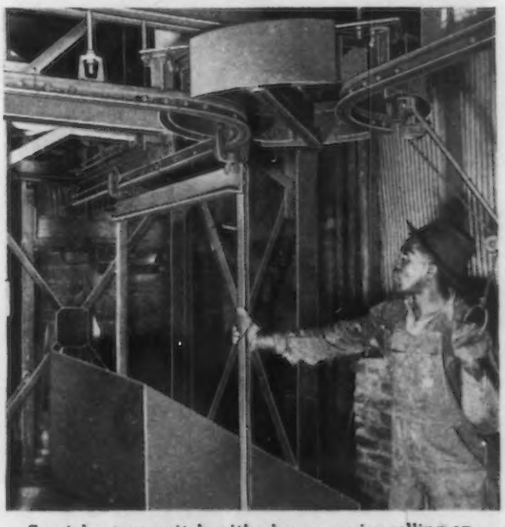
Twin hoists, mounted on special crane, provide cleaning operation for metal tube parts.

THE battle of production, too, can be won in the air. That is, on overhead handling equipment.

American MonoRail Equipment will increase your production and afford a substantial saving in your handling problems.

You can accelerate your rate of production as rapidly as you release man power from handling labor—illustrations show how this can be done with American MonoRail Equipment.

Let an American MonoRail Engineer explain many other advantages of overhead handling equipment. Regardless of size of installations, from the simplest to the most complicated, our engineers can help solve your handling problem. This service is without cost or obligation. There is no delay or shut-down during installation. Write today.



Special rotary switch with charge carrier rolling on elevator to charging floor.

Write for Blue Book illustrating hundreds of MonoRail installations.

THE AMERICAN MONORAIL CO.

13103 ATHENS AVENUE ★ CLEVELAND, OHIO

cision lathe, 16 x 30 in. centers (reverse to lead screw); heavy duty engine with geared head, 20 in. x 4 ft. centers; universal, horizontal, knee type milling machine, No. 2 high speed, standard; vertical milling machine, No. 2 standard high speed; 36 x 36 in. x 8 ft., double housing, metal planer; 16 in. heavy pattern horizontal, plain metal shaper; universal grinding machine, 10 x 24 in. swing and distance between centers. If he has these machines they would be coded in the following letters: ADC—BGG — BSK — CEH — CFP — DAE — DEE — EAG — FAD — KFA, respectively.

THE subcontractor then compares his coded machinery with the Index to Jobs. The Index to Jobs is another alphabetical list of machine tools with each line representing the machines or combination of machines needed to do a particular job. The total machine hours per week to meet the schedule are indicated as well as a key to the Breakdown of Jobs.

This Breakdown of Jobs is the final information needel by a subcontractor trying to find out if his shop will fit the job, and determines whether he shall call for blue prints. Machine hours per week to make each part according to schedule, the number of weeks the work will require for completion, the supplier of jigs, patterns and material, the kind of material the part is made of, and the weight of the finished part, are all shown. In addition, tolerances to which the subcontractor's machine must work, and over-all dimensions of each part are listed. The contractor's name, address, or his box number, are likewise set forth.

GOING back to the subcontractor who had coded his machinery, and to the point where he was examining the Breakdown of Jobs, assume he found a line in the index reading ADA-DAE-EAE. The only matching machine would be line DAE, or the universal, horizontal knee type milling machine. No. 2 high speed standard. Nevertheless he could do the job because his ADC, or 36 in. vertical boring and turning machine, side head and turret rail head, would be larger than the listed ADA (a 24 in. machine of identical type). And similarly, his EAG, or planer would be larger than the EAE or smaller planer called for in the job. The idea is that equivalent machines may be employed wherever feasible, and even machines of earlier models if they are suitable to the job.

TOLERANCES are expressed in the Breakdown of Jobs, following the code letters of each machine to show the closest tolerance to which the machine must work. To explain how tolerances appear, and how they are read the following figures are set forth: $0.5 = \mp .0005$. $2.0 = \mp .002$. It may be seen that the $\mp$ tolerances are added together to show the total allowance. If no figures appear, it means that the tolerance is greater than ten one-thousandth's, except where the three-letter code designates testing, plating, X-ray or other shop equipment. Obviously, in such a case, tolerances are not involved.

After the subcontractor has decided he can do a job, he is directed to communicate with the prime contractors, giving shop descripton, number of men employed, length of time in business, the Breakdown List number and item number of each drawing he wants to see.

If the prime contractor decides to send drawings, they will be accompanied by the Breakdown Lists, from which the information in the Directory was taken. This list gives not only the information contained in the Directory concerning machines and tolerances, the kind of material, etc., but all the operations to be done on each machine and the time it should take each machine to do the work on that particular part.

ON these full Breakdown lists every operation that is done on a given machine is put down in its proper sequence and all the operations on that machine are underlined. The code letters of the machine to be used in these operations appear in the Machine Recommended column just to the right of the last operation, like this: *FC TU DG TK CF* CFE (face, turn, drill, thread, chamfer, engine geared head lathe, heavy duty, 14 x 54 in. centers). When such an underline appears, column headings, above the underline may be disregarded. If there is a bar between two operations, for example (FC/TU DG TK CF) it is an indication that the piece has either been rechucked on the same ma-

THE BULL OF THE WOODS — BY J. R. WILLIAMS

YOU ABSOLUTELY CAN'T BE HONEST! THAT GUY IS TOO HONEST TO SLEEP ON DUTY, BUT IS CROOKED ENOUGH TO BE LOOKOUT MAN FER TH' SLEEPERS--SO HE CAN'T BE HONEST AN' BE AN ACCESSORY TO BREAKIN' RULES!
SURE YOU KIN! THERE'S NO RULE AGIN WAKIN' PEOPLE--HE'S JUST A GOOD GUY, AN' YOU KNOW WHAT A GOOD GUY IS--IT'S A GUY WHO GIVES ALL HIS TOBACCO AWAY, LOANS ALL HIS TOOLS, HELPS EVERYBODY, TURNS DOWN NOBODY, AN' FINALLY LANDS IN THE POOR-HOUSE--THAT'S A GOOD GUY!
REDRAWN BY REQUEST
J.R.WILLIAMS
THE GOOD GUY?
5-15
T. M. REG. U. S. PAT. OFF.
COPR. 1942 BY NEA SERVICE, INC.

chine or taken off at that point to be put on another machine and then returned to this machine for the remaining operations.

Breakdown Lists are intended to serve as bases for estimates. It is pointed out that a subcontractor should be able to tell before he submits his estimate, with the time on each machine given, whether he is within striking distance of the job.

THE National Association of Manufacturers has indorsed the plan, and the following companies have jobs listed in the Breakdown of Jobs:

Crane Co.; International Harvester Co.; Automatic Electric Co.; Automatic Transportation Co.; Athey Truss Wheel Co.; Sterling Tool Products Co.; Stiger-Hilton Co.; Fee & Stamwedel Inc.; Cullen-Friestedt Co.; Lion Mfg. Corp.; Binks Mfg. Co.; Blaw-Knox Division of Blaw-Knox Co.; American Locomotive Co.; Miehle Printing Press & Mfg. Co.; Pettibone Mulliken Corp.; Hurley Machine Co.; Stewart-Warner Corp.; Guardian Electric Mfg. Co.; Chicago Electric Mfg. Co.; the Electromotive Division of the General Motors Corp.; and the Whiting Corp.,—all of the Chicago district.

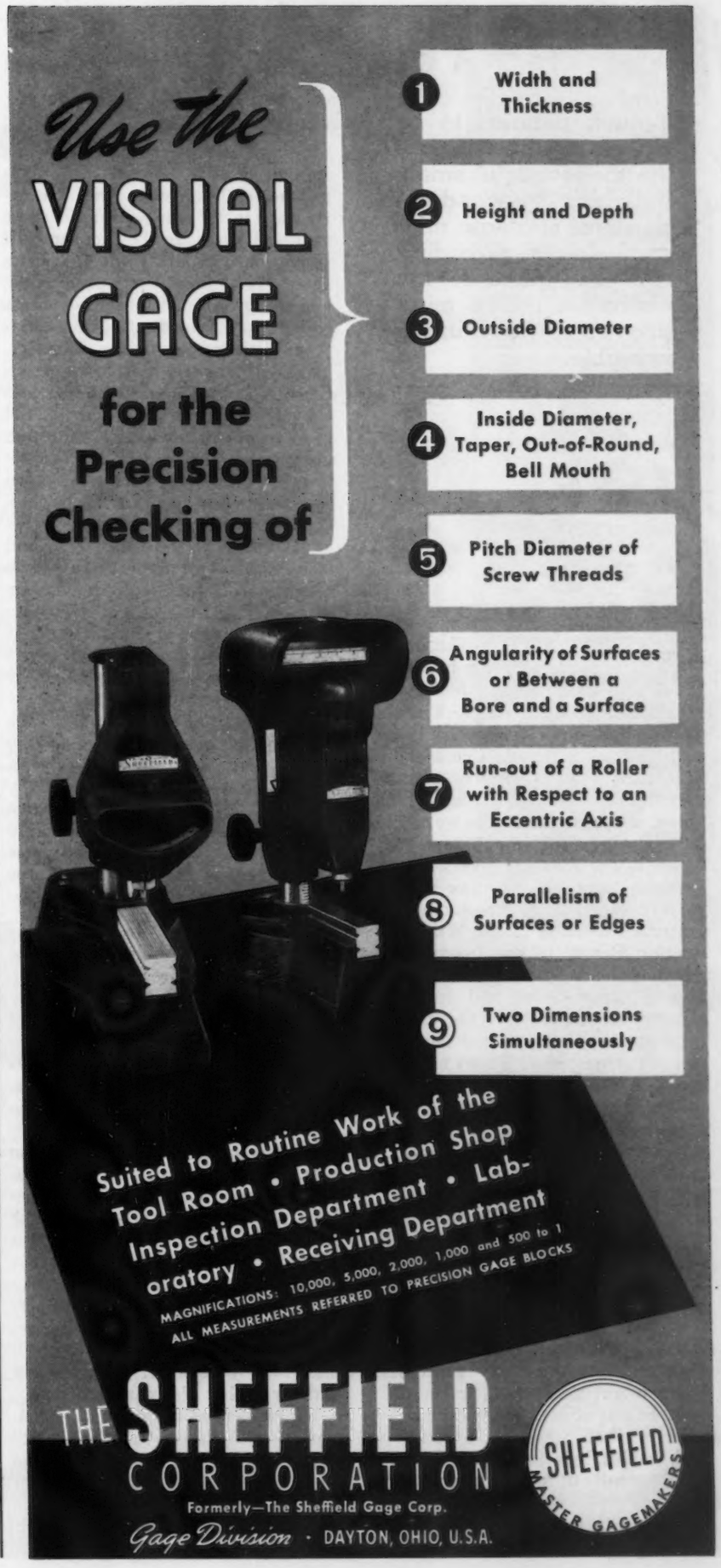
Allis-Chalmers Mfg. Co., Milwaukee; Kearney & Trecker Corp., Milwaukee; Jorgenson Engineering Co., Beloit, Wis.; and the Cooper-Bessemer Corp., Grove City, Pa.

WPA Lifts 6600 Tons Rails; 200 Autos Are Seized

Washington

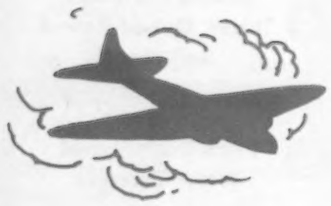
• • • **WPA workers** removed more than 6600 tons of abandoned street car rails during March, according to F. H. Dryden, acting WPA commissioner. He announced a plan involving the adaptation of the nation-wide WPA salvage collection project to rail removal from city streets.

Meanwhile the bureau announced it had requisitioned the entire stock of about 200 wrecked cars in the graveyard of the Lenox Motor Co., Colmar, Md. The bureau charged that Leo F. Donovan, owner of the company, refused to remove the wrecked cars and rejected offers which the bureau considered fair. The ceiling price for such metal in the Washington area has been set by OPA at $18.75 per ton, delivered at the mill.


Use the VISUAL GAGE for the Precision Checking of
1 Width and Thickness
2 Height and Depth
3 Outside Diameter
4 Inside Diameter, Taper, Out-of-Round, Bell Mouth
5 Pitch Diameter of Screw Threads
6 Angularity of Surfaces or Between a Bore and a Surface
7 Run-out of a Roller with Respect to an Eccentric Axis
8 Parallelism of Surfaces or Edges
9 Two Dimensions Simultaneously
Suited to Routine Work of the Tool Room • Production Shop Inspection Department • Laboratory • Receiving Department
MAGNIFICATIONS: 10,000, 5,000, 2,000, 1,000 and 500 to 1
ALL MEASUREMENTS REFERRED TO PRECISION GAGE BLOCKS
THE SHEFFIELD CORPORATION
Formerly—The Sheffield Gage Corp.
Gage Division • DAYTON, OHIO, U.S.A.
SHEFFIELD MASTER GAGEMAKERS

WEST COAST . . .

• Much remains to be accomplished before the thousands of small, individually owned deposits of strategic minerals begin providing real assistance to the nation . . . One mine proves surprisingly valuable.



SAN FRANCISCO — The broad pattern of a program by which Uncle Sam hopes to fill his strategic mineral needs to a great extent from domestic ores is gradually becoming clear. Considering that little more than five months ago foreign sources from which these strategic minerals were obtained were still intact, and that losses to the enemy cut very deeply in many cases, it is a fine tribute to William L. Batt, director of the materials division of the War Production Board, to the Department of the Interior, to the Reconstruction Finance Corp. and its subsidiary, Metals Reserve Co., that a program has been thrown together in such short order. Flaws may develop, and some flaws are already glaring, but action is what was ordered, and action is what is taking place.

There is no question in the case of minerals which were formerly imported principally that production from domestic deposits will prove substantially more expensive. Speaking in broad terms, and simplifying to the bone, the problem that immediately presented itself was substantially this: Shall we use commercially untested processes which might make possible the use of large lots of extremely low grade ores, or shall we dot the country with rabbit hole mines to get out small deposits of high grade ores?

In the long run, the answer is going to be "Both," for the Metals Reserve Co. has already reduced to almost minute quantities the minimum size of shipments which it will accept of chrome, manganese, and tungsten ores. Nevertheless, it is going to take more than that to make the thousands of small, individually owned deposits accessible, finance their production, and set up sufficient purchase points to bring any substantial quantities from little mines to big industry. The red tape that still stands in the way is staggering; the pick and shovel prospectors are bewildered by government forms; the thorough going machinery of the Reconstruction Finance Corp. is drawing down complaints for slowness in processing loan applications (although this is partly due to the applicants) and is badly understaffed for this type of work; it is practically impossible to justify a road to get access to some of the smaller deposits and, if a road can be justified, applications practically have to be certified by the Secretary of War or Navy to get funds; and there is still lack of financial incentive necessary to bring many deposits into production. These problems eventually will be cleared up, but by the time they are the summer working period will be over and the snow will again be 10 ft. deep on the mountainous mineral storehouses.

MEANWHILE, definite steps have been taken to utilize the large, low grade ore deposits which require beneficiation. It soon became apparent that mechanical beneficiation for most low grade domestic chrome and manganese ores was impractical. In normal times, chemical beneficiation spells uneconomic expense, and so has not been practiced commercially. Despite the cost, chemical beneficiation processes, untried except in the laboratory, seem to be the order of the day. If they fall flat in actual commercial operation, some of the rosier hopes for using domestic ores will turn blue, but if the commercial production limits give this reaction on one process, others will undoubtedly be tried. We must cut and try—what else can be done?

In the case of magnesium reduction, for instance, the first "cut" did not work out as well as had been hoped although it cost about a half million dollars, but no discouragement is evident and modifications are being worked out. At least we know what won't work, and that is valuable knowledge.

Some of the chemical beneficiation processes may hit comparable bumps, but, after all, the country is up against it.

PROBABLY the tightest situation in the long run, and one which we shall have to utilize all our resources to meet, is in chromium. Therefore, action by Rustless Iron & Steel Corp. in ceasing ore production at its El Dorado County, California, property because of lack of further ore of commercial grade, comes as bad news. The El Dorado County operation, incidentally, was the only one of consequence in operation in this country prior to the defense emergency. Rustless, however, is continuing to work its recently opened chromite deposit on the other side of the Sacramento Valley, near Willows, Cal., but the limitations of this deposit are understood to be definitely known. With most other large chrome deposits of low grade, and high in iron, success in chemical methods of beneficiation may tell the tale as to what will be available to the steel industry when the season is over.

Despite efforts to reduce consumption, the tungsten problem is by no means solved. Discoveries are being made of ores which lend themselves to economical concentration, but it will take time to make the country self-sufficient. Some of the old lead-silver mines are taking new life as tungsten producers, and some reliable quarters believe that a higher unit price would stimulate production still further.

The country's problem with regard to mercury is not one of immediate shortage, but rather of uncertainty. Most deposits are small, and when these are worked out, maintenance of production will depend upon discovery keeping pace with requirements.

Despite locally published reports to the contrary, hopes of domestic tin production in commercial quantities still are not well founded. The small veins that exist cannot be magnified much even by putting them in large type.

Production of large quantities of domestic manganese also is a touch-and-go problem of successful beneficiation.

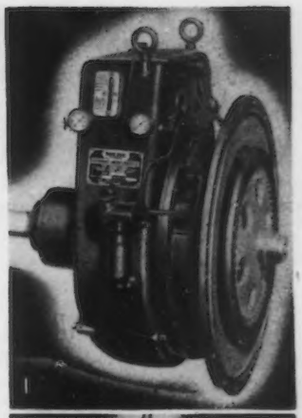
No time to lose!

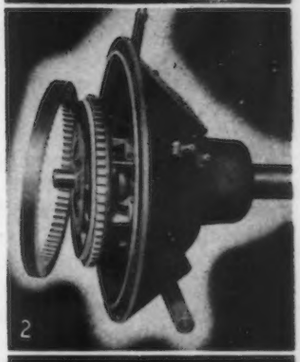
America at war cannot afford a single minute of lost production due to breakdowns or preventable delays. Every minute saved brings us closer to our goal: Winning the War!

In all types of production machinery, Twin Disc Clutches are giving the dependable service that only years of research and specialization can assure.

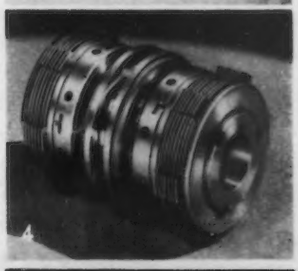
No matter where your plant may be located, you can be sure of competent service or parts for your Twin Disc Clutches, Power Take-offs or Hydraulic Drives. Strategically located throughout the country are 7 factory branches and 30 parts stations, all prepared to meet your service and parts need at any hour of the day or night. Complete stock of parts assures prompt shipment, even for exceptional or unusual demands. This complete service organization protects you against interrupted production, helps you to maintain emergency schedules.

TWIN DISC CLUTCH CO., 1370 Racine St., Racine, Wisconsin.


1


2

3


4

1. *Twin Disc Hydraulic Torque Converter. In considering installation, ask for complete data and specific recommendations.* **2.** *Twin Disc Model E Clutches, heavy-duty, enclosed type. Sizes: 14" to 42" in single or two-plate assemblies.* **3.** *Twin Disc Power Take-off for engines having up to 285 hp. output. Sizes: with single plate clutches, 6½" to 24"; double plate, 11½" to 18". Housing sizes: No. 6 S.A.E. to No. 00 S.A.E.* **4.** *Twin Disc Machine Tool Clutches, single or duplex to run dry or in oil. Sizes: 2½" to 12". Illustrated: MTU Single Hub to run in oil.*

Twin Disc replacement parts in these cities:

Alabama: Montgomery, Parts Service Corp. **California:** Los Angeles, Charles W. Carter Co.; San Francisco, Charles W. Carter Co. **Colorado:** Denver, Liberty Trucks & Parts Co. **Florida:** Jacksonville, Motor Parts & Supply Co. **Illinois:** Chicago, Wisconsin Industrial Parts. **Kansas:** Great Bend, Scheufler Supply Co. **Kentucky:** Lexington, Wombwell Auto Parts Co. **Louisiana:** New Orleans, Mechanical Equip. Co. **Maine:** Portland, Southworth Machine Co. **Massachusetts:** Boston, Rapp Huckins Co., Inc. **Michigan:** Detroit, W. C. Ducomb Co., Inc. **Minnesota:** St. Paul, Truck Parts, Inc. **Missouri:** St. Louis, Twin Disc Clutch Co. **New York:** Buffalo, Edward W. Rode; New York, Twin Disc Clutch Parts & Service of New York, Inc. **Ohio:** Cincinnati, C. McCash; Cleveland, Twin Disc Clutch Co.; Cleveland, Industrial Engine Parts. **Oklahoma:** Tulsa, Twin Disc Clutch Co. **Pennsylvania:** Philadelphia, Twin Disc Clutch Parts & Service of Philadelphia; Pittsburgh, Contractors Equip. Ser. Co. **Tennessee:** Knoxville, Automotive Equip. & Supply Co.; Memphis, Choctaw Culvert & Machinery Co. **Texas:** Dallas, Twin Disc Clutch Company; Fort Worth, John Muller Co.; Houston, Portable Rig Co., Inc.; John Muller Co. **Utah:** Salt Lake City, Lund Machinery Co. **Virginia:** Richmond, Standard Parts Corp. **Washington:** Seattle, Twin Disc Clutch Co.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES
REG. U. S. PAT. OFF.

Every once in a while an extremely encouraging discovery is made. For instance, a mine in the Pacific Northwest which was being developed for gold turned out to be one of the country's largest antimony reserves and has come into production as a principal tungsten source.

THROUGH the efforts of the National Aircraft Standards Committee, which held its third national meeting last week in Hollywood, aluminum aircraft tubing specifications have been standardized to such an extent that it is hoped that tubing production will thereby be raised by 20 per cent. The number of alloys to be used in tubing will be reduced from seven to three, and the number of different sizes cut from more than 2000 to less than 200. The WPB scheduling unit is said to be ready to cooperate by instructing tubing manufacturers not to accept orders for alloys, tempers, or sizes not included in the improved group, unless a specific deviation has first been considered and granted. The new standard will be put into effect immediately.

It also became apparent last week that eight major southern California aircraft producers who a month ago formed the Aircraft War Production Council to promote coordination within the industry hope to expand it into a national organization. From the standpoint of creating a united front for the industry in the field of industrial relations, as well as promoting production coordination, the Council would seem to be an ideal group. It will take several weeks to learn whether such an organization can be made to function on a national basis. If it cannot, it will greatly strengthen the united AFL-CIO clan in picking off the companies individually.

ANOTHER topnotch CIO United Automobile Workers' organizer, Richard Frankensteen, who is designated as UAW aviation director, visited the Coast last week to organize the organizers for the union's spring drive. Although the "drive" will be concentrated on Douglas, Frankensteen said that the UAW will also seek to organize Northrop, Bendix, United Aircraft, and Interstate Aviation. If the drive seriously hinders production, it will seriously delay efforts to make any advanced models in sorely needed classifications available this summer.

Contract has been awarded to Birchfield Boiler Co., Tacoma, for an open hearth steel stack at Bethlehem's Seattle plant indicating that expansion of Bethlehem's raw steel facilities at its three Coast plants is actually under way. This will more than bring to completion expansion of Coast steel capacity contemplated in the Hauck report more than a year ago.

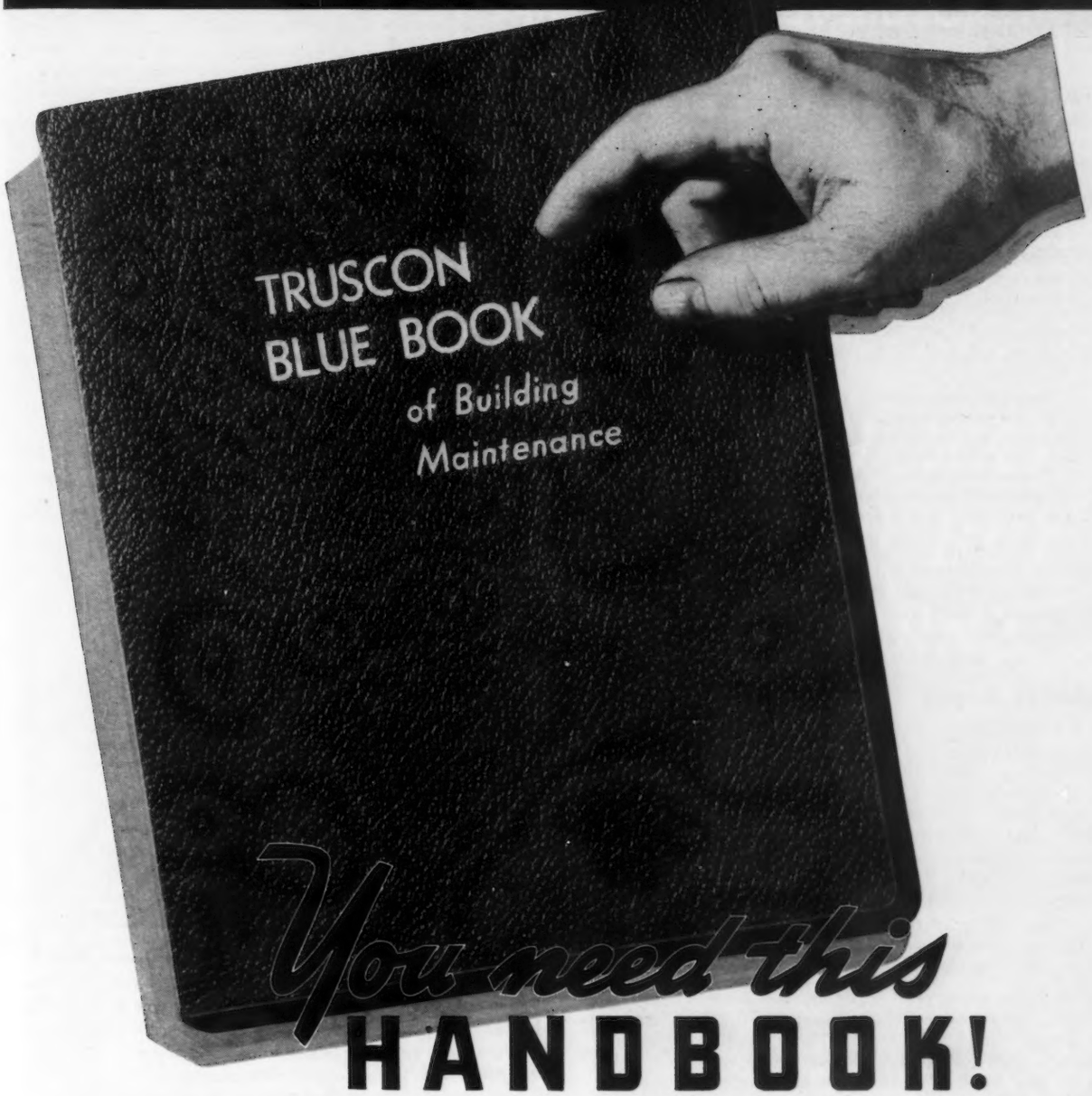
The scrap situation in both mill and foundry grades is substantially improved. Definite results are traceable to the Bureau of Industrial Conservation in the automobile graveyard, industrial salvage and general salvage sections particularly the first two.

April Steel Production Reaches 97.7%

	STEEL INGOT OUTPUT IN NET TONS					PER CENT OF CAPACITY			
	Open Hearth	Bessemer	Electric	Total	Weekly Output	Open Hearth	Bessemer	Electric	Total
1941									
January	6,276,429	451,637	200,019	6,928,085	1,563,902	99.1	76.0	91.0	96.9
February	5,673,289	378,330	186,281	6,237,900	1,559,475	99.2	70.5	93.9	96.6
March	6,461,936	460,169	209,536	7,131,641	1,609,851	102.0	77.4	95.4	99.7
1st Quarter	*18,411,654*	*1,290,136*	*595,836*	*20,297,626*	*1,578,353*	*100.1*	*74.8*	*93.4*	*97.8*
April	6,135,941	395,009	225,999	6,756,949	1,575,046	100.0	68.6	106.2	97.6
May	6,365,172	444,361	243,705	7,053,238	1,592,153	100.5	74.8	110.9	98.7
June	6,103,767	458,242	238,721	6,800,730	1,585,252	99.5	79.6	112.2	98.2
2nd Quarter	*18,604,880*	*1,297,612*	*708,425*	*20,610,917*	*1,584,237*	*100.0*	*74.3*	*109.8*	*98.2*
1st 6 months	*37,016,534*	*2,587,748*	*1,304,261*	*40,908,543*	*1,581,312*	*100.1*	*74.5*	*101.6*	*98.0*
July	6,089,859	489,239	242,584	6,821,682	1,543,367	94.4	85.0	87.4	93.4
August	6,243,100	495,523	262,334	7,000,957	1,580,351	96.6	85.9	94.4	95.7
September	6,058,731	500,687	260,288	6,819,706	1,593,389	97.0	89.8	96.9	96.4
3rd Quarter	*18,391,690*	*1,485,449*	*765,206*	*20,642,345*	*1,572,151*	*96.0*	*86.8*	*92.9*	*95.2*
9 months	*55,408,224*	*4,073,197*	*2,069,467*	*61,550,888*	*1,578,228*	*98.7*	*78.6*	*98.2*	*97.0*
October	6,427,977	532,863	281,843	7,242,683	1,634,917	99.4	92.3	101.4	99.0
November	6,198,368	488,986	282,633	6,969,987	1,624,706	99.0	87.5	105.0	98.3
December	6,395,387	481,706	286,906	7,163,999	1,620,814	99.2	83.6	103.4	98.1
4th Quarter	*19,021,732*	*1,503,555*	*851,382*	*21,376,669*	*1,626,839*	*99.2*	*87.8*	*103.2*	*98.5*
Total 1941	*74,429,956*	*5,576,752*	*2,920,849*	*82,927,557*	*1,590,479*	*98.8*	*80.9*	*99.6*	*97.4*
1942									
January	6,332,628	490,864	305,859	7,129,351	1,609,334	95.4	86.0	96.3	94.7
February	5,795,932	453,543	275,636	6,525,111	1,631,278	96.7	88.0	96.2	96.0
March	6,574,701	493,294	324,916	7,392,911	1,668,829	99.1	86.4	102.3	98.2
1st Quarter	*18,694,642*	*1,437,701*	*906,546*	*21,038,889*	*1,635,994*	*97.0*	*86.7*	*98.3*	*96.3*
April	6,346,707	454,583	321,023	7,122,313	1,660,213	98.8	82.2	104.4	97.7

Source: American Iron and Steel Institute. The percentages of capacity operated in the first 6 months of 1941 are calculated on annual capacities as of Jan. 1, 1941, as follows: Open hearth 74,565,510 net tons, bessemer 6,996,520 net tons, electric 2,586,320 net tons. Beginning July 1, 1941, the percentages of capacity operated are calculated on annual capacities as follows: Open hearth 76,079,130 net tons, bessemer 6,793,400 net tons, electric 3,272,370 net tons. The percentages of capacity operated in 1942 are calculated on weekly capacities of 1,498,029 net tons open hearth, 128,911 net tons bessemer and 71,682 net tons electric ingots and steel for castings, total 1,698,622 net tons; based on annual capacities as of Jan. 1, 1942, as follows: Open hearth 78,107,260 net tons, bessemer 6,721,400 net tons, electric 3,737,510 net tons.

MAINTENANCE EXECUTIVES



You need this HANDBOOK!

Trade Mark Registered

It simplifies your building maintenance problems. It tells you HOW—to harden cement floors—to rust-proof steel sash, tanks and structural work—to slip-proof floors and landings—to dust-proof cement floors and stairs—to acid-proof steel work—to protect and restore wood floors—to reduce sun glare—to waterproof new construction—and how to get efficient, economical solutions to many more maintenance problems.

***FREE**—to plant maintenance executives. Request must be written on business stationery to Dept. I-24.*

TRUSCON LABORATORIES
DETROIT • MICHIGAN

Fatigue Cracks

BY A. H. DIX

Mad Miller

• • • DEMAND RETRACTION ON LIBELLOUS HEADLINE PAGE 62 YOUR APRIL 30 ISSUE.
A. W. MILLER

The headline referred to in the telegram reads, *"Rejuvenating an Old Miller."* As the text makes clear, the operation concerns only a lower-case miller, and umbrage taken by A. W. or any other upper-case Miller is wholly unwarranted.

Vote for Dewey

• • • I have previously heard this "Damn the torpedoes, go ahead!" attributed to Farragut, and it annoys and pains me, purely in the interest of justice and fair play . . . I was only a boy in 1898 when Dewey gallantly steamed into Manila Bay . . . and I well remember this saying came out in the daily papers immediately. Dewey gets my vote and hearty support on this . . .
—*J. Malvern Benjamin*

Farragut, when about to enter Mobile Bay, was warned that the waters were full of torpedoes (a torpedo was originally any kind of an explosive mine)—what we would now call a mine field.

"Damn the torpedoes! Full speed ahead!" roared the dauntless old sea dog, lashing himself to the rigging as you have often seen in the old painting.
—*Deac*

Our money is on Deac, who knows everything and who is never wrong. An anonymous Detroiter writes that Perry did not say, "Don't shoot till, etc." He says Perry said, "Don't give up the ship." "But," he adds, "I always credited Brigham Young as being the originator." We don't get it.

Blurb By Burgess

• • • John Howe Hall writes that he thought Oliver Herford invented the word *blurb*, but *Readers' Digest* credits it to Gelett Burgess. The *Digest* is right. Herford invented *goop*.

Scholarly P. (Westinghouse) MacGahan points out that while formerly applied only to publishers' exaggerations, *blurb* now has general usage as "a fulsome commendation." For instance, a Michigan manufacturer says:

"My hat is off to THE IRON AGE *on the wonderful service you present each week. Of all the trade papers I receive this is the best."*

We have no reason to doubt the sincerity of this tribute, but its down-to-the-floorboard quality imparts a faintly blurbish bouquet. There used to be a time when a high-voltage love letter would raise our pulse to 85 and send us running to the photostat machine. But we learned that oftentimes high voltage affection lacks longevity. There have been cases where just a brief year after being told we were the ne plus ultra we found another warmed by the love that once was ours.

So we have come to prefer the carefully calibrated compliment, which renders us our exact due and no more. For instance:

"We find your publication satisfactory."
"There is much useful information for us in your publication."
"We like THE IRON AGE."
"Your publication is serving our needs."

While these are hardly incandescent, we find they are good for a lifetime.

He Reached for a Superlative

• • • The foregoing applies, of course, only to the general observations. Life for us would be dull without the flares of admiration for specific links in the chains that bind your f.f.j. to you. To illustrate, we quote from a letter a member of the brains department just received from a welding authority who has sent him some data on a new development:

I have just seen The Iron Age and to put it mildly was intensely pleased at the way the article was worked out, amassed, presented, or whatever it is you editors call it when you do a good job.

I am very much convinced that this combination of a man thoroughly familiar with reader interest and the way to get that reader interest with somebody who has a bit of information to present, results in effective presentation of the article . . . It is a very fine job.

Fifty Cars Mislaid

• • • In one yard, 350 cars were cut up in three weeks but the owner had taken in 150 other cars thus showing a net loss of only 150 cars on his inventory.
—THE IRON AGE, *April 30, page 114*

You delight in poking fun at other persons' arithmetic. How about your own?
—*J. M. Benjamin*

That was the day the dictionary stand fell on the brains department's adding machine.

Smelted Scrap

• • • To smelters who hold no priorities, almost any kind of steel scrap is worth almost any price.
—*Time*

The hell it is.

Yesterday's Supermen

• • • We have used the name "The Iron Age" so long that sometimes we forget we haven't sole rights to it. Frequently we get mail intended for A. B. Farquhar Co., Ltd., York, Pa., which manufactures a line of farm implements trademarked "Iron Age." H. Childs & Co., Pittsburgh, makes "Iron Age" safety shoes, and Henry Sotheran, Ltd., London dealer in rare books, sends us a catalogue offering a 12-volume set of English plays, published in 1632 under the title "The Iron Age." We reproduce the title page here to show you how much better our spelling and artwork are than our forebear's.

The Iron Age:

Containing the Rape of *Helen*: The siege of *Troy*: The Combate betwixt Hector and Ajax: Hector and Troilus slayne by Achilles: Achilles slaine by Paris: Ajax and Ulisses contend for the Armour of Achilles: The Death of Achilles &c.

Written by THOMAS HEYWOOD.

Non prodigi filium non Deliftare.

HECTOR

AJAX

Printed at London by Nicholas Okes, 1632.

Stoppers

• • • Smoother faces give rock swallowers good appetites—*Russell, Burdsall & Ward.*

Our candidate for the year's best headline is Bendix Aviation's *"He can't fly a rousing cheer!"*

Jap Map

• • • That Jap industrial map in the Apr. 30 issue was the outgrowth of repeated requests for information on Nippon plant locations. The Japanese have always been as close-mouthed as counterfeiters with regard to their manufacturing operations. So the brains department had to start from scratch in preparing the map. While it does not entirely pierce the carefully wrought fog that veils the Rising Sun's factories, it is a starter.

Puzzles

• • • Last week's numbers are 18, 19 and 20.

A solution to this in five minutes gets you a gold star on your report card:

A field has the shape of an equilateral triangle. The area of the field is the same number of square feet as there are yards in the perimeter. What is the length of a side, and what is the area of the field?

Four Ways To Buy MOTORS!
1. BEING SOLD. This isn't really "buying."
2. ORDERING BY TRADE-MARK. Unsound, because all well-known motors are not alike.
3. ORDERING BY HABIT. Costly, because motors and power needs have changed since old habits were formed.
4. BUYING BY COMPARING MOTORS. The sure way to get top value.
WHICH WAY DO YOU BUY MOTORS?
BECAUSE we believe you know motor quality when you see it, we highly recommend Method 4—buying by comparing motors.
Yes, proud as we are of the Fairbanks-Morse trade-mark, we ask you to look beyond the trade-mark . . . to ignore sales talks and buying habits . . . and look at the motors, construction point by point.
Compare the exclusive Fairbanks-Morse Copperspun Rotor, for instance, with any other type of rotor. Then ask yourself whether you want windings centrifugally cast of COPPER, or of some less suitable metal.
A post card or telephone call will bring you a demonstration . . . let you look beyond the trade-mark at the rotor and at the many other construction superiorities which make F-M Motors stand up better under today's production tempo. Fairbanks, Morse & Co., Dept. E38, 600 S. Michigan Ave., Chicago. Branches and service stations throughout the United States and Canada.
Copperspun
FAIRBANKS·MORSE MOTORS
DIESEL ENGINES ELECTRICAL MACHINERY MAGNETOS RAILROAD EQUIPMENT WASHERS IRONERS STOKERS
PUMPS MOTORS FAIRBANKS SCALES WATER SYSTEMS FARM EQUIPMENT AIR CONDITIONERS

Dear Editor:

ARMAMENT MANUFACTURE

Sir:

I was informed that you have a number of booklets on armament. Would you please inform me how I can go about getting them.

I am employed by the Army Ordnance Department as an inspector and these booklets would help me very much.

FREDERICK F. ADAM,
Frankford, Pa.

• Demand for the 109-page reprint of Iron Age articles on shell and cartridge manufacture has exhausted the supply. A new, larger edition is being printed—128 pages, title "Munitions and Ordnance Manufacture," price $1. It will be ready in about ten days.—Ed.

POWDER METALLURGY

Sir:

We would like to get a copy of THE IRON AGE, the issue of Sept. 4, 1941. On page 37 there is an article on "Hot Pressing of Iron Powders." It is this particular subject in which we are interested.

S. L. KAYE,
Consolidated Molded Products Corp., Scranton, Pa.

• The demand for clippings of this and other articles on powder metallurgy exhausted our supply. All have been reprinted in the cloth bound "Modern Materials" book, which, with supplement, totals about 260 pages, price $2.50.—Ed.

RECLAIMING PLATED METALS

Sir:

We enjoyed reading your article "Reclaiming Plated Metals" by W. Machu, Vienna, in your April 2 issue of THE IRON AGE, and in fact, would like very much to get in touch with Mr. Machu.

Would you please advise us by return mail where we may communicate with him.

JACK J. CHERNYK,
Chicago Alloy Products Co., Chicago

• We are afraid this will have to wait until the war is over, as mail service between this country and Vienna is non-existent.—Ed.

EMERGENCY WHEEL

Sir:

I am very much interested in the photographs and short description of the "Minute Emergency Auto Wheel" appearing on Page 91 of the April 23 issue.

Will you please advise me the name and address of the manufacturer of this useful gadget.

W. M. BALLENGER,
General Electric Co., Chicago

• The device has not yet reached the production stage. The inventor is Nicholas Z. Grasso, Hollis, L. I.—Ed.

GAGE BLOCK FACTORY

Sir:

In last week's "Dear Editor" page, Joseph Porzel referred to an article about "The Most Important Factory in the United States." This wasn't an article. It was a Corborundum Co. advertisement on page 386 of your Jan. 1, 1942, issue, and has to do with the backyard shack in which George Webber of Cleveland makes block gages.

A. W. MILLER,
New York

• Congratulations to Reader Miller on his excellent memory.—Ed.

ELECTROLYTIC TIN PLATE

Sir:

I have just read, with a great deal of interest, your article in the April 30 issue on "Tin Plate." I want to highly compliment your organization on a most interesting and accurate article.

F. G. WHITE,
Granite City Steel Co., Granite City, Ill.

Sir:

I read with considerable interest your article on "The Tin Can" in April 30 issue of THE IRON AGE.

In view of your thorough and comprehensive treatment of this subject, I would appreciate receiving reprint copies of this article. The article is indeed excellent for reference and indicative of the status of electro tin plate industry to date.

PAUL J. LALONDE,
Research Dept.,
Hanson-Van Winkle Munning Co., Matawan, N. J.

Sir:

This office was very, very much interested in your article entitled, "Food in Cans," which appeared in the April 30 issue.

We would like to obtain three reprints. If there is any charge for same, we will gladly remit by return mail.

L. G. TAYLOR,
War Production Board, Baltimore

Sir:

I was particularly interested in your article on the Tin Can, as published in your issue of April 30. Please send me an extra copy of this issue and bill me for same.

R. A. NEISH,
Tin Mill Office,
Jones and Laughlin Steel Co., Aliquippa, Pa.

• Reprints are being made and will be ready in a few days.—Ed.

JAP MAP

Sir:

We note with interest your announcement in the April 23 issue of THE IRON AGE of the Map of Japan's War Industries to appear in the April 30 issue.

Would it be possible to obtain two extra copies for our personal use?

E. R. ABBE,
Materials Engineer,
J. M. STOKELY,
Metallurgist,
Standard Oil Co. of Calif., Richmond, Cal.

BLAST FURNACE MOISTURE

Sir:

There is no deep secret as to the correct amount of blast moisture that a blast furnace needs for optimum production. It is well known that there are days when the tonnage cast will be a record. All that has to be done is look up those days and get hold of the wet and dry bulb thermometer charts for those days. From these charts the absolute humidity in grains per cubic foot can be fixed quite closely. With this data it is quite easy to determine the dehumidifying plant required, using either refrigeration or silica gel. However, it is necessary at the same time to install apparatus which will, when the moisture is too low, add humidity to the blast. The check on the adequacy of the measures taken will be that the stack makes casts which will be approximately uniform in weight.

A. DENISON WILLIAMS,
New York

BOUQUET

Sir:

The only thing I am sorry about THE IRON AGE is that I didn't start buying it ten years ago!

Saw a sign on a cross country truck today which read, "If you don't buy more stamps and bonds, a Jap may drive this truck some day." Cute, eh?

My personal thanks for your splendid editorials.

CHAS. A. ALEXANDER,
Engineer,
Norfolk, Va.

H. S. TIPS

Sir:

I would very much appreciate receiving two clippings of the article "High Speed Steel Tips, Cemented to Low Alloy Shanks," appearing in THE IRON AGE of April 16.

WYMAN C. TUPPER,
Jones & Lamson Machine Co., Springfield, Vt.

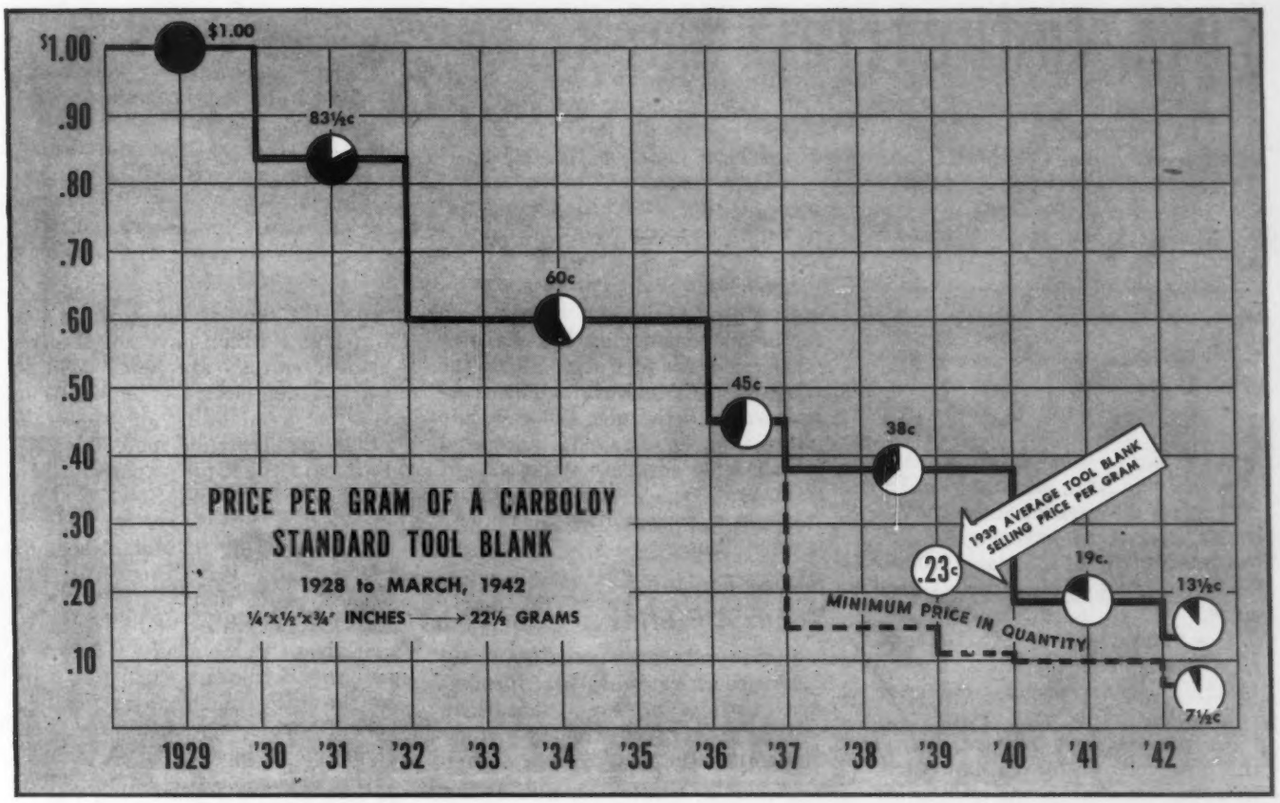
SAE-AISI STEELS

Sir:

If reprints are available, will you please send to my attention a copy of "Correlated SAE and AISI Revised Standard Steels," which appeared in the April 9 issue.

D. E. MERRIMAN,
Purchasing Agent
Stanley Works, New Britain, Conn.

• Reprints are available.—Ed.



WHAT PRICE CARBOLOY?

Since October, 1928, Carboloy Company, Inc., has continuously passed on to industry, savings in cost that could be effected without detriment to the broad development program being carried on. Under this policy—despite years of profitless operation—a total of seven price reductions were made. Beginning in 1930, the price of a 22½ gram standard Carboloy tool blank, for example, has been steadily reduced from an original $1.00 per gram—to as little as 7½c per gram today. In larger sizes minimum prices per gram are even lower. Prices of complete Carboloy standard tools are now close to the best grades of steel tools.

Background for this development has been the worst depression in the nation's history—poor years for the costly development work needed. But from that work have come vast strides in processing—refinements of the original carbide—many new carbides—new machines, new grinding wheels, new techniques of design, application and maintenance—extensive training of manpower.

Today—in the midst of the most crucial production era in its history—America is reaping the benefits. It has the *domestic capacity* to produce—is actually producing—vital carbides in unprecedented quantities—completely independent of *outside* manufacturers. It also has the *knowledge* to employ those carbides effectively—to obtain performance in the order of 20 to 1 over ordinary tools.

Contributing largely to reductions in cost has been the steady trend towards standardization and mass production techniques. Originally, practically every piece produced was "hand made." Today, automatic presses—operating 24 hours a day—are turning out thousands, millions of blanks for the nation's war plants. A large proportion of Carboloy production is now standard. Continued effort is being made to further divert special requirements into standard lines. For, greater standardization means greater output—greater economy—greater aid towards victory. ★ ★ Carboloy Company, Inc., Detroit, Mich., Chicago, Cleveland, Los Angeles, Newark, Philadelphia, Pittsburgh, Seattle, Worcester, Mass.

CARBOLOY

Reg. U. S. Pat. Off.

TOOLS • DIES • GRINDING WHEEL DRESSERS
CORE BITS • MASONRY DRILLS • WEAR PARTS

MANUFACTURERS OF TOOLS, GAUGES, ETC., SUPPLYING PRODUCTS TIPPED WITH CARBOLOY CEMENTED CARBIDES

B. C. Ames.....Waltham, Mass.
Apex Tool & Cutter, Shelton, Conn.
Barber-Colman.....Rockford, Ill.
Bokum Tool.....Detroit
Carbide Tool.....Chicago
Cleveland Cutter & Reamer Cleveland
Cleveland Twist Drill..Cleveland
Cogsdill Twist Drill.....Detroit
Cole Carbide..Royal Oak Mich.

A. A. Crafts.....Boston
Criterion Machine Wks. Beverly Hills, Calif.
Davis Boring Tool.....St. Louis
Detroit Boring Bar.....Detroit
Henry Disston & Sons Philadelphia
Eclipse Counterbore.....Detroit
Ex-Cell-O Corp.....Detroit
C. J. Forthman.....Cincinnati
Gairing Tool.....Detroit

Gen. Eng. & Model Wks. Pittsburgh
Genesee Tool.....Fenton, Mich.
Giern & Anholtt Tool....Detroit
Goddard & Goddard.....Detroit
Gorham Tool.....Detroit
Hartley Wire Die Thomaston, Conn.
Kelly Reamer.....Cleveland
Kiffer Tool & Die....Cleveland
Lincoln Park Tool & Gage Lincoln Park, Mich.

Lovejoy Tool, Springfield, Vermont
Madison Mfg...Muskegon, Mich.
McCrosky Tool....Meadville, Pa.
Midwest Tool & Mfg.....Detroit
Mistro Tool & Gage.....Chicago
Morse Tool.....Detroit
Morse Twist Drill & Machine New Bedford, Mass.
Motor Tool Mfg.....Detroit
National Tool.....Cleveland
O. K. Tool.....Shelton, Conn.

Option Tool & Mfg...Pittsburgh
J. S. Popper, Inc., Union City, N.J.
Production Tool Co. of America Detroit
Reeder Carbide Tool.....Detroit
R. & M. Mfg.....Detroit
Scully Jones.....Chicago
Sheffield Corp.....Dayton, Ohio
Ralph Shipman...Sunbury, Pa.
Simonds Saw & Steel Fitchburg, Mass.

Landon P. Smith, Irvington, N. J.
Sommer & Maca Glass Machinery Chicago
Sprague & Henwood, Scranton, Pa.
Standard Gage, Poughkeepsie, N.Y
Standard Tool.....Cleveland
Staples Tool & Engineering Cincinnati
L. S. Starrett.....Athol, Mass.
Strauss Co.....Pittsburgh

Super Tool.....Detroit
Trubor Tool.....Yonkers, N. Y.
Tungsten Carbide Tool...Detroit
United Twist Drill & Tool, Chicago
Van Keuren Co.....Boston
Harry W. Wagner.....New York
Walker Tool Cleveland
Wendt-Sonis Drill Wks. Hannibal, Mo.
Weaver Co.....Detroit
Wetmore Reamer....Milwaukee

This Industrial Week . . .

o o o

SINCE one step in winning the war is the providing of all steel plates needed by the nation's shipyards, reports of improvement in the plate supply situation must be classified as good news.

For many months plate demands, because of sharp increases in shipbuilding, have outrun production from plate mills and from other mills pressed into service to roll this product. In March and April, however, shipments of plates on Maritime Commission orders actually met the tonnages asked.

"The pressing problem of the maritime shipbuilding program is to have the right plates at the right yard at the right time," said C. E. Adams, chief of the WPB Iron and Steel Branch. The problem of ordering and scheduling to insure the proper distribution of plates is now being attacked by the WPB and the Maritime Commission.

Some Yards Amply Supplied

Some shipyards report no loss of production due to shortages of steel plates and for some weeks have found their needs satisfied during a period when the shortage of this product was being emphasized by various speakers on war production. To permit each shipyard to have an assorted backlog of plates on hand (as in peacetime), shipments to the Army, Navy, railroads and war plants under construction would have to be curtailed.

The plan to step up national plate output is said to include a project to transfer the old Brier Hill plant of Youngstown Sheet & Tube Co. to Texas for reassembly and eventual operation. Plans for reconditioning National Tube Co.'s McKeesport plate mill have been suspended. An insufficiency of ingot capacity at one point is a factor in considering the transfer of the Sheet and Tube mill to the southwest. Meanwhile, construction work on the new Lukens plate mill has been delayed by federal restrictions governing the use of structural steel, thus requiring substantial redesigning to complete the building.

Sheet Orders Taken Off Mills

In several cases recently, steel sheet orders carrying high preference ratings or even allocations have been taken off wide strip mills. These are to be distributed to other sheet makers because the necessary plate production to be turned out on the wide strip mills is so great that no room is left for sheet production except for widths of 72-in. or over. Displacement of sheet tonnage by plates on wide mills is expected to continue and other sheet mills unable to produce large quantities of plates will roll highly rated sheet business.

An expansion development is Defense Plant Corp. authorization for building of a blast furnace, open hearths and other units by Otis Steel Co. This project, to be started shortly, will cost approximately $15 million. Some builders of vitally needed war plants are working with extraordinary speed —an example being a West Coast project where a highly rated blast furnace is now expected to be completed by Jan. 1, 1943, far ahead of schedule. On May 27, Republic Steel Corp. will blow in a new Southern blast furnace completed in a period so short as to establish a new world record for such a job.

(William L. Batt, director of the WPB materials division, told THE IRON AGE on Tuesday that all new war plants which have not received project ratings are being held up pending completion of a WPB survey on availability of steel and other construction materials. Mr. Batt said the Utah expansion program of Columbia Steel Co. has received a project rating and is under way. C. H. Matthiesen, director of the WPB Bureau of Priorities, said that the Henry J. Kaiser Associates, RFC financed steel plant in Southern California, and the Bethlehem Steel Co. plant in the Los Angeles area had received project ratings for construction of part of these plants.)

One expansion project for which U. S. industry hopes only the worst of luck and all kinds of shortages, including structural steel, is that of Japan's Kobe steel works. This company (see THE IRON AGE map of industrial Japan in the April 30 issue) is planning to increase its steel capacity and convert part of its equipment to manufacture of light metals.

Ore Fleet Sets Record

For the first time in the history of the Great Lakes ore fleet, operations this year began in March and the fleet, up to May 1, had hauled 8,585,740 tons of ore. Prior to May 1, last year, only 6,954,793 tons of ore had been transported. April ore movements alone showed a 12 per cent increase over the same month of 1941.

For the first April on record, finished steel shipments by subsidiaries of U. S. Steel Corp. last month totaled 1,758,894 net tons, compared with 1,687,674 tons in the corresponding month last year. Shipments for the first four months of

Steel Ingot Production—Per Cent of Capacity

(Open Hearth, Bessemer and Electric Ingots)

	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	S.Ohio River	West	St. Louis	East	Aggregate
This Week.....	99.0	105.5	100.0	92.0	100.0	104.5	83.0	98.5	105.0	101.0	98.0	100.0	104.0	99.5
Last Week.....	100.0	105.5	101.0	92.0	95.0	106.5	83.0	98.0	101.5	101.0	97.0	105.5	99.0	99.5

1942 were 256,367 tons above the total for the like period of 1941.

This week THE IRON AGE estimates steel ingot production for the country at 99.5 per cent, unchanged from last week's all-time high. The raw materials situation, particularly in scrap, has eased throughout the industry and furnaces now idle for the most part are down for repairs. Important steel making districts, reporting stronger mill schedules this week include Cleveland, up five points to 100 per cent, Birmingham one-half point to 98.5 per cent, Detroit 4.5 points to 105 per cent, the Western rate one point to 98 per cent and the Eastern district rate five points to 104 per cent. Three of the major districts and St. Louis report slightly lower operations. Pittsburgh ingot output is down a point to 99 per cent, Youngstown a point to 100 per cent and Buffalo is off two points to 104.5 per cent. St. Louis operations are off five and a half points to 100 per cent. Areas where operations are unchanged include Chicago at 105.5 per cent, Philadelphia at 92 per cent, Wheeling at 83 per cent, and the Southern Ohio River district at 101 per cent. Weekly production of steel ingots in the U. S. is well over 1.6 million tons.

C. E. Adams, chief of the iron and steel branch, materials division, War Production Board, resigned that position May 7.

Steel bookings so far in May are approximately equal to the April flow for a few companies but other mills report additional backlog expansion. Some companies note that more orders are being placed for large tonnages for deliveries over a regularly spaced period of time. Shipments of steel to truck manufacturers will be more favorable now that ratings for most manufacturers have been moved upward, so that this means of commercial transportation can aid the hard-pressed railroads.

To some observers the big news of the past week is an agreement by the Federal Shipbuilding & Drydock Co., U. S. Steel Corp. subsidiary, to enter into a new CIO union contract which includes a "maintenance of membership" clause. This step was taken under pressure of the National War Labor Board which now may apply the same pressure to the "Little Steel" companies and thus force the union shop, in which a workman must pay dues to hold his job, on the entire steel industry. How the U. S. Steel subsidiary regards its new CIO contract is shown by comment of its president, L. H. Korndorff, that: "While this company has accepted the 'directive order' of the National War Labor Board, we are bound to say that we have done so solely under the compulsion of war.

"We regard the so-called 'maintenance of membership' directive as unwise and unsound and as tending without the sanction of Congress to set up a national war policy which will not be conducive to obtaining maximum production at the Kearny shipyard. But—we are at war. There is imperative need for ships and more ships. The prolongation of this controversy might result in serious loss of production," Mr. Korndorff said.

Regardless of the public's view on making union membership a condition for holding a job, trade union leaders in the steel and other industries regarded the federal ship case as a notable victory. At Pittsburgh the SWOC is preparing to change its name to the United Steel Workers of America under a permanent organization (to be known as the USA). Inland Steel Co. officers have announced that it may put the matter up to a vote of the company's stockholders if the War Labor Board orders a "maintenance of union" clause in the SWOC-Little Steel case.

Many business men will weigh thoughtfully the Office of Price Administration's announcement that all scrap dealers must be licensed by the Government to engage in business. While some war agency leaders are known to be against licensing of manufacturing companies, the application of this form of control to scrap dealers may be useful to some in "determining the direction of the wind." In the case of iron and steel scrap, dealers selling to a consumer or a consumer's broker are to be licensed.

Full text of OPA order licensing scrap dealers appears on page 134.

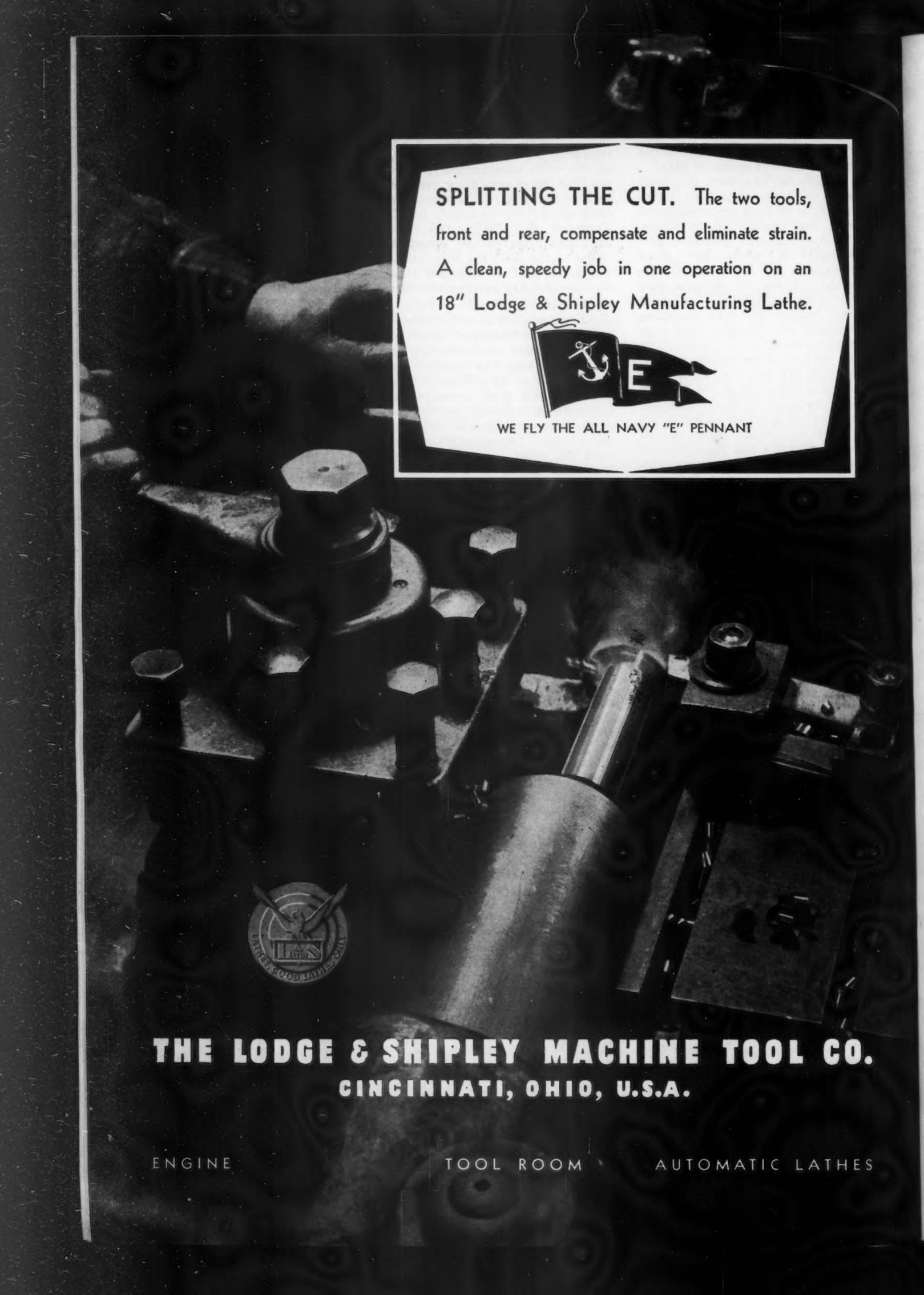
Priorities developments this week were led by action placing all alloy iron and steel products under a unified allocation system. Control of alloying metals entering into various furnace heats will be subject, after June 1, to monthly melting schedules to be issued by the WPB Director of Industry Operations. The new order, Amendment 3, to Supplementary Order M-21-A, provides that no iron or steel may be melted or delivered to fill orders lower than A-1-K, except for certain National Emergency steels which may be produced for orders down to A-3 ratings.

For latest priority regulation developments and revisions to THE IRON AGE *priorities guide, turn to page* 113. *Latest price control news appears on page* 104.

Net Earnings of 22 Steel Producers

COMPANY	First Quarter 1942	First Quarter 1941	Fourth Quarter 1941	Total Earnings 1941
U. S. Steel Corp.	$27,921,534	$36,559,995	$20,331,427	$116,019,518
Bethlehem Steel Corp.	6,140,668	10,436,028	10,459,742	34,457,796
Republic Steel Corp.	4,716,962	8,189,967	6,041,244	24,038,340
National Steel Corp.	2,675,837	5,430,398	4,180,078	17,102,350
Youngstown Sheet & Tube Co.	2,576,579	4,576,197	3,678,158	16,124,000
Inland Steel Co.	2,528,090	3,469,090	3,576,711	14,824,053
Jones & Laughlin Steel Corp.	2,491,718	4,160,507	4,234,599	16,274,983
American Rolling Mill Co.	1,731,635	3,599,241	3,012,715	11,228,475
Wheeling Steel Corp.	1,200,090	1,981,009	1,943,753	8,506,304
Colorado Fuel & Iron Co.	823,273	1,141,756	806,450	3,615,560
Pittsburgh Steel Co.	645,334	889,700	803,203	3,169,598
Carpenter Steel Co.	626,777	614,280	.....	.....
Wickwire Spencer Steel Co.	†721,580	231,172	.....	1,578,463
Keystone Steel & Wire Co.	364,083	410,137	.....	.....
Sharon Steel Co.	250,302	527,253	407,224	1,833,364
Otis Steel Co.	240,015	416,622	735,788	.....
Alan Wood Steel Co.	217,041	351,794	*35,504	1,051,772
Copperweld Steel Co.	199,119	*331,818	.....	.....
Midland Steel Products Co.	176,073	546,643	.....	.....
Continental Steel Corp.	169,337	313,122	293,524	1,225,674
Follansbee Steel Corp.	165,308	.....	124,826	445,963

†—Before tax provisions.
*—Adjusted net income.


SPLITTING THE CUT. The two tools, front and rear, compensate and eliminate strain. A clean, speedy job in one operation on an 18" Lodge & Shipley Manufacturing Lathe.
E
WE FLY THE ALL NAVY "E" PENNANT
THE LODGE & SHIPLEY MACHINE TOOL CO.
CINCINNATI, OHIO, U.S.A.
ENGINE
TOOL ROOM
AUTOMATIC LATHES

News of Industry

• • •

Way Cleared for WPB To Force Union Shop On "Little Steel" Mills

Kearney, N. J.

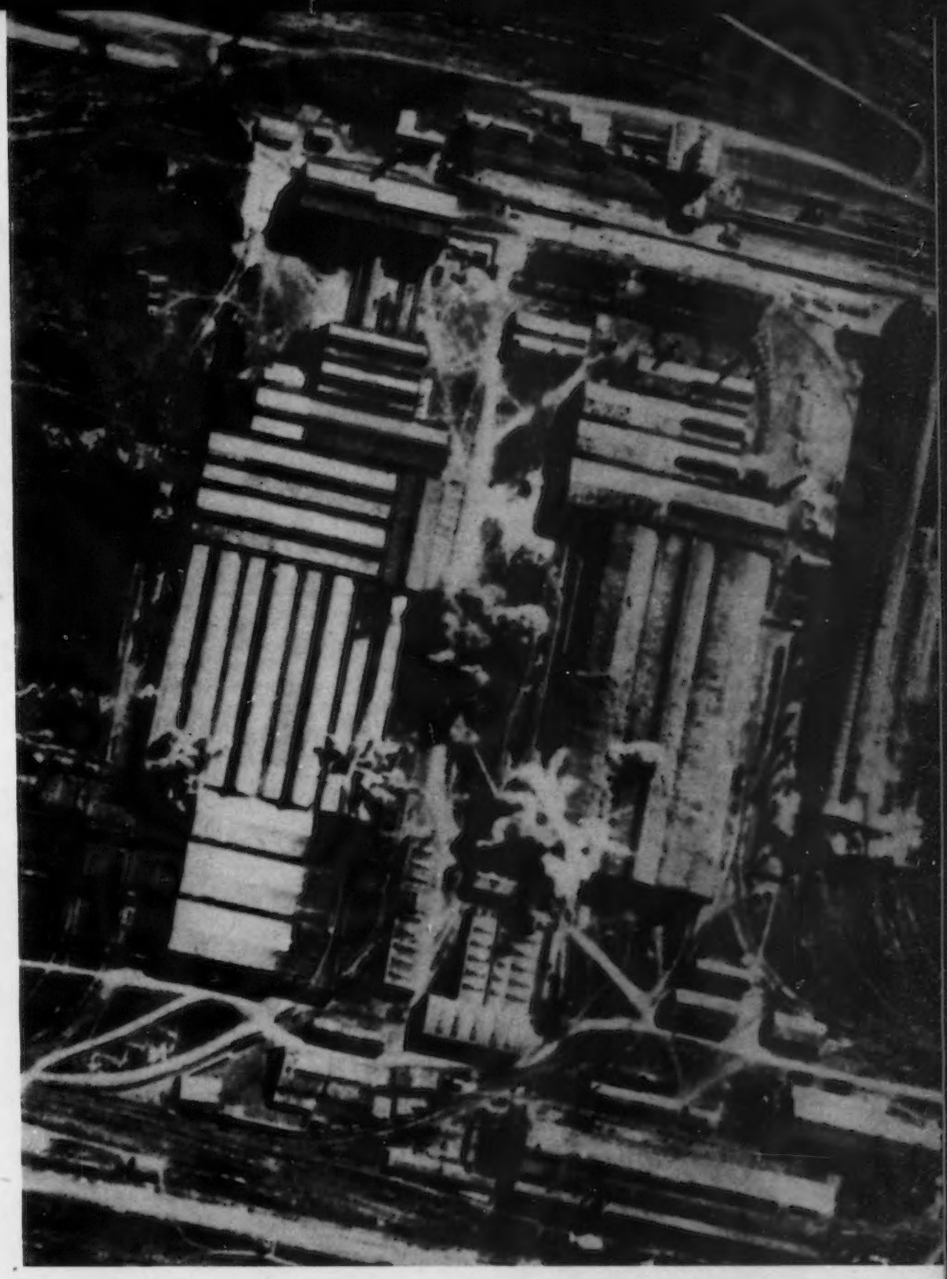
• • • **Federal Shipbuilding** & Dry Dock Co., U. S. Steel subsidiary, last week agreed to enter into a new union contract, including a "maintenance of membership" clause, as directed by the National War Labor Board, taking this action "solely because of the war emergency and this country's great need of ships in order successfully to prosecute the war."

Steel circles in Pittsburgh received the Federal Shipbuilding decision with considerable interest since many informed quarters believe there is a possibility that the NWLB may take the "maintenance of membership" method as a way out of the "Little Steel" case now before the War Labor Board panel. This latter case involves SWOC requests for $1 a day increase, a union shop, and a dues checkoff. If the NWLB should eventually issue a directive on "little steel," imposing a maintenance of membership clause, whether or not the steel companies would accept such a directive remains to be seen. Regardless of the fine points and definitions, etc., most industrialists consider the maintenance of membership clause another form of closed shop and checkoff.

L. H. Korndorff, president of Federal Ship, said, "While this company has thus accepted the 'directive order' of the National War Labor Board, we are bound to say that we have done so solely under the compulsion of war. We regard the so-called 'maintenance of membership' directive as unwise and unsound and as tending without the sanction of Congress to set up a national war policy which will not be conducive to obtaining maximum production at the Kearney shipyard.

"But we are at war. There is imperative need for ships and more ships. The prolongation of this controversy might result in serious loss of production. The NWLB acting under the authority conferred in it by the President, has issued a directive order in this case which we are advised may be complied with without violating the law. Much as we differ with the majority of the board on matters of fact as well as of policy, we recognize the board as the final arbiter of labor disputes within the law. . ."

In Mr. Korndorff's statement it was pointed out that any employee now belonging to the union could, if he so wished, withdraw during the 10 day or more period before the "maintenance of membership" clause is incorporated into a contract entered into by both parties and would thus, if he withdrew, not be subject to discharge for not paying labor dues or fines when the contract became effective. On the other hand, employees who are members of the union when the contract including the "maintenance of membership" clause is agreed upon, must keep their dues



Wide World Photo

BOMBING A STEEL PLANT: This R.A.F. photo shows hits being scored by bombers in a recent daylight attack on a steel plant at Mondeville, near Caen, in Northern France.

AP Photo

THE CORP. MEETS: Stockholders of the U. S. Steel Corp., met for the annual meeting on May 4 at Hoboken, N. J. Here, left to right, Nathan L. Miller, general counsel and former governor of New York; Iriving S. Olds, chairman; Benjamin F. Fairless, president; and Enders M. Voorhess, chairman of the finance committee, enjoy a luncheon at the meeting.

AP Photo

CURTISS' WARHAWK: The new Curtiss "Warhawk," successor to the famous "Tomahawk" and "Kittyhawk," was demonstrated for the first time on May 6 at the Curtiss-Wright upper New York state plant.

British-Combine Photo

DESERT BOMB DUMP: Members of this British bomb crew stand in the middle of the bomb dump somewhere in desert Africa. These will be presented to Rommel's Africa Corps at the first opportunity.

paid up as a condition of employment and are liable to discharge if such is not the case. Any employee wishing to escape such penalty may request the ship building company in writing to deduct from his pay each month and pay to the union a sum equivalent to his union dues and any fines imposed by the union.

It had been pointed out earlier in the Kearny case that a man may withdraw from the union but not be discharged from the company if he continues to pay union dues or fines throughout the life of the contract. At the end of that period, it was stated that the employee, having withdrawn from the union, would not be subject to the maintenance of union membership clause contained in any subsequent contract, providing his financial obligations under the initial contract had been fully met.

↓ ↓

CIO Loses Election at Thompson Products Plant

Cleveland

• • • **The CIO-UAW union** lost its campaign to win bargaining rights for the 8224 maintenance and production workers of Thompson Products, Inc., and Thompson Aircraft Products Co., Euclid, Ohio, subsidiary, by a two-to-one vote, in the largest NLRB collective bargaining poll ever held in Cleveland, according to Hugh E. Sperry, regional NLRB director. At the main plant the "disestablished" independent union, Automotive and Aircraft Workers Alliance, recognized by the company and not on the ballot, won a moral victory when 2519 votes were cast for neither the CIO nor the AFL Machinists Union; of the 3943 votes cast here 1288 were for the CIO-UAW and 87 for the AFL. At the TAPCO plant the independent Aircraft Workers Alliance received 2249 votes out of 3614 ballots cast, as against 1203 for the CIO-UAW, and 134 for neither union.

Ray S. Livingstone, director of personnel, announced that the company would continue to bargain with the A.A.W.A. and continue in effect a contract with the unaffiliated union "until the courts rule otherwise."

Inland May Conduct Poll on Compliance

Washington

• • • **Vice-president** Clarence B. Randall of Inland Steel Co., at a press conference on Wednesday of last week, said that if the War Labor Board orders a "maintenance of union membership" clause in the SWOC-Little Steel case he may put the matter of compliance up to a vote by the company's 8500 stockholders. Basing his opinion on board decision in the International Harvester Co., Federal Shipbuilding & Dry Dock Co. and other cases, Mr. Randall said he thought the steel companies would be ordered to incorporate a "union security" clause in SWOC contracts.

He contended that the board does not have jurisdiction to order a "closed shop." Making it clear that he was speaking solely for Inland, Mr. Randall said that the company had not waived the question of jurisdiction and that it is not properly before the board, which was set up by executive order. He is of the opinion that decisions by any tribunal, the Supreme Court alone excepted, can be appealed. Because "union security" involves a highly important policy, he said that company officials would like the advice of their stockholders in passing upon the question. No individual, Mr. Randall said, holds more than 4 per cent of the company's 1,600,000 shares of stock.

Pointing out that his position regarding the closed shop is unlike that of the public members of the WLB, Mr. Randall said:

"I cannot believe that the President or Congress would place the power over personal liberty in the hands of Davis, Taylor, Graham and Morse." These men are public members of the board of which W. H. Davis is chairman. The board, in the opinion of Mr. Randall, has only two functions, mediation and arbitration.

That the President has the power to seize the company's plant in the event production is interrupted Mr. Randall did not question and he made it plain that, regardless of what may be the board's decision, there will be no interruption of output so far as the company is concerned. He said that interruption by any

AP Photo

GM VS. UAW: Charles E. Wilson, center, president of General Motors, yielded on May 7 to the WLB order for temporary extension of double pay for Sunday work after Wayne L. Morse, left, WLB member, declared the company was on a "sitdown strike." Walter Reuther, right, UAW director for GM units, also was a witness at the Washington hearings.

AP Photo

AIR-BORNE FIELD GUNS: From this cargo transport plane that landed them near their objective in air-borne maneuvers, the U. S. Marines unload a 37 mm. anti-tank gun. The plane also carried a new type midget car.

Globe Photo

DRAFTSWOMEN: N. P. Clark, Goodyear Industrial University instructor, initiated women students training for junior draftsmen into the fundamentals of the field. The girls are taking a 3-month training course to enable them to replace men called to service.

G. A. WELDING *Shop Notes*

Will It Hold?

A working pressure of 450 lbs. per square inch at 1000°F. is common for G. A. "Fluid-Fusion" Welded Vessels. Equipment produced by this exclusive G. A. process is now operating successfully at 800 to 1000 lbs. pressure—and much higher pressures are quite feasible. Unique General American manufacturing methods permit use of extra-heavy walls giving a wide safety factor under extreme conditions of pressure, temperature and corrosion.

PLATE AND WELDING DIVISION

GENERAL AMERICAN TRANSPORTATION CORPORATION

GATX GENERAL AMERICAN

Cable Address GENTANWELD Sharon, Pa.

PLATE & WELDING DIVISION

PLANT AT SHARON, PA.

Offices In All Principal Cities

source, whether management or labor, would be equivalent to sedition. He scoffed at labor's claim to credit for giving up the "right" to strike in wartime. Public hearings before the board are expected to begin in two or three weeks.

While Mr. Randall is opposed to SWOC's demand for a $1 a day wage increase, he said Inland would not resist any decision relating to higher wages because the board has jurisdiction over that question. He said that the Inland-SWOC contract is ready for signing except on the controversial questions of the $1 a day wage increase and the closed shop. He took a fling at SWOC for its "beautiful technique" in using the term "union maintenance" when the steel case was certified to the board. The phrase was never used in discussions or correspondence between the company and the union, Mr. Randall said. The only phrase used, he pointed out, was "closed shop." The reason the union abandoned that phrase when the case was certified to the board, Mr. Randall said, was because of the strong public reaction against the "closed shop." "Union maintenance" was branded as a deceptive phrase intended to indicate the status quo.

Mr. Randall turned to a brief discussion of what he called the ABC technique of Wayne L. Morse (public member of the board) for making decisions. These three points are: A: Inter-union rivalry; B: Employer anti-labor bias, and C: Aid to the war effort.

There is no inter-union rivalry or employer bias against labor at the Inland plants, Mr. Randall said. To the question whether "union membership maintenance" would aid the war effort, Mr. Randall said that it is "just not so." To support his statement, he said that Inland for three months has been operating at 105 per cent of capacity, that 52 per cent of its production is under defense directive, 42 per cent under A-1-a ratings and that none of the remaining tonnage has a lower rating that A-1-c. Should it be held that "union maintenance" is an aid to the war effort, Mr. Randall declared, it is futile to go to the board any more, because it would be done without regard for facts. There is no doubt, said Mr. Randall, that union membership will be abused and become the focal point of a new organizing campaign.

Asked about union membership of Inland employees, Mr. Randall

MEET "OTTO NOBETTER": This novel method of bringing plant safety to the attention of employees is used at the Allison Division, GM, Indianapolis. "Otto Nobetter," a plastic cartoon, shows employees what shouldn't be done in the way of creating a safe plant in which to work.

Globe Photo

said that 70 per cent at one time or another belonged to SWOC at the companys Indiana Harbor plant in one sense or another.

"That is," Mr. Randall added, "they signed the card. A great many signed through fear."

He said he did not know how many paid their dues but that he knows that every 30 or 60 days the "boys got their heads beaten off if they didn't sign their dues cards." Since the steel case went to the board, however, Mr. Randall said that there has not been much violence.

Mr. Randall said that Phillip Murray, CIO and SWOC head, has done a "manly, forthright job" to prevent strikes but that he did not think Mr. Murray should be "paid off by the War Labor Board for doing what is his manifest duty."

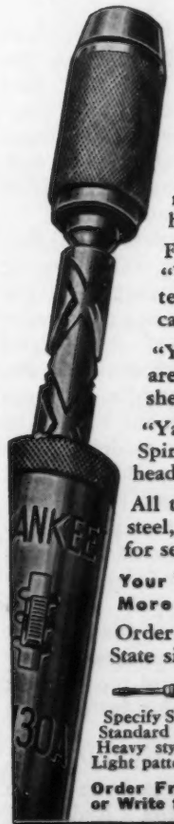
Trade of Union Shop For Pay Raise Reported

Chicago

• • • **Prominent Chicago** industrialists participating in hearings before the War Labor Board have resigned themselves to the fact that the board henceforth will grant "maintenance of membership" provisions in practically all cases where unions ask for them. This belief, recently expressed to THE IRON AGE by spokesmen of two companies who have been engaged in hearings with the labor board, is based on several factors. The first is the President's recent announcement that wages must be frozen and the belief that the unions will be given membership maintenance as a sop in lieu of wage increases. The second is the fact that the board granted the maintenance provision in the International Harvester Co. case, despite the findings of the preliminary panel against this clause.

It was widely accepted by labor spokesmen here that Harvester would not be asked to accept the maintenance clause because of recent elections held at most of its plants which resulted in several disputed elections which had to be reheld. In most plants the margins between the AFL and CIO were so close that any decision favoring one was expected to be fought by the loser with the devious means of attack possessed by the labor groups.

MAKE THE MOST of your "YANKEE" Spirals



"YANKEE" HEAVY DUTY SOCKET
"YANKEE" CENTERING SLEEVE BIT
"YANKEE"-PHILLIPS BITS
"YANKEE" HEAVY DUTY BITS
"YANKEE" STANDARD BITS
Order by Style No. on Yankee Driver

. . . To Help DRIVE Ahead

Increase production! Speed up assembly lines with Accessories for "Yankee" Spiral Ratchet Drivers.

"Yankee" Sockets, hexagon and combination, drive bolts, run up nuts, like a flash. Special *Heavy Duty* Sockets made for hex nuts and self-tapping hex head screws.

For slotted screws, "Yankee" Bits with Centering Sleeve automatically place blade in slot.

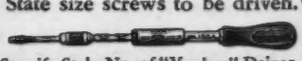
"Yankee" *Heavy Duty* Bits are ideal for self-tapping sheet metal screws.

"Yankee"-Phillips Bits for Spirals take care of recessed head screws.

All three styles are of alloy steel, hardened and tempered for severe service conditions.

Your "Yankee" Spirals Are More Than Screw Drivers.

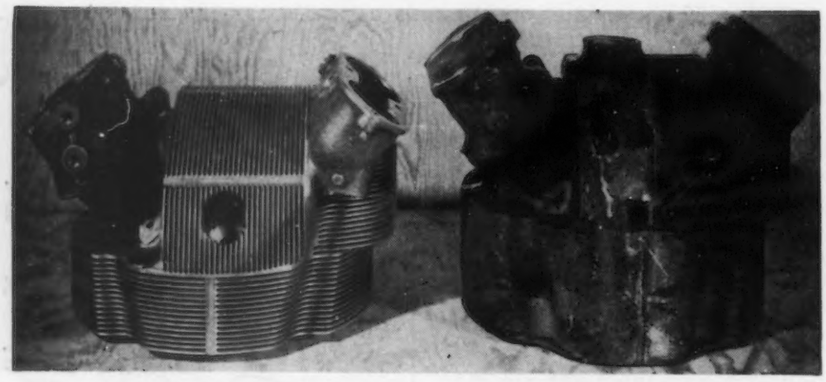
Order Accessories by *name*. State size screws to be driven.



Specify Style No. of "Yankee" Driver. Standard size, No. 30A or No. 130A. Heavy style, No. 31A or No. 131A. Light pattern, No. 35 or No. 135. Etc.

Order From Your Supply House or Write for "Yankee" Catalog IA-5

NORTH BROS. MFG. CO., PHILADELPHIA, U.S.A.



Acme Photo

NEW TYPE CYLINDER HEAD: Wright Aeronautical designed this new forged cylinder head, pressed into shape by dies from an extruded billet. Newly designed milling machines cut cooling fins, and the new style engine part is said to give planes superiority in speed, altitude, load, and range.

Wright Aero to Forge Aluminum Cylinder Heads

• • • **A new technique of forging** aluminum aircraft engine cylinder heads which will give American planes added tactical advantages in air combat and at the same time speed up manufacture was announced last week by Myron B. Gordon, vice-president and general manager of the Wright Aeronautical Corp.

Compared with the older type of sand cast aluminum head, the new forged head is 10 per cent lighter, has 35 per cent more cooling area, is 100 per cent stronger and will increase the power output of each cylinder 12 to 15 per cent. The heads forged by the new process permit higher engine compression ratio, owing to their doubled strength and the increased cooling area and greater heat conductivity of the forged metal compared to cast aluminum. The design also permits enlargement and improvement of intake and exhaust ports, which result in increased power output, and lower fuel consumption.

Labor costs in terms of manhours will be reduced approximately 15 per cent. In some parts of the process, a few unskilled workmen can produce results that take 150 foundry workers under the old process, and operations that took 2½ hr. can be done in 1¼ min.

In the process, extruded aluminum slugs are forged in three steps in 1000-ton hydraulic presses. The forgings will be subcontracted to idle automobile shops that have the necessary equipment. The machining of the heads will be performed in a series of eight special milling machines, using high speed carbide tipped milling saws. The longest single milling operation takes only 6½ min. a head.

The process will be made available to the entire aircraft industry during the war, Mr. Gordon said.

Wheeler New Regional WPB Director For New England

• • • **Walter H. Wheeler, Jr.** has been appointed New England Regional Director of the War Production Board. The Regional Office, which will have its headquarters in Boston, will administer all WPB field offices in the six New England states.

Mr. Wheeler had been with the Contract Distribution Branch of the WPB since Oct. 24, 1941. In 1919 he entered the Universal Stamping Machine Co. at Stamford, Conn., predecessor of the Pitney-Bowes Postage Meter Co. For twenty-one years he has been president and general manager of the Pitney-Bowes Company. He is also president and director of the Canadian Postage Meter and Machine Co., Ltd., and is a member of the Business Advisory Council of the Department of Commerce.

Replacing Mr. Wheeler as chief of the Contract Distribution Branch of the WPB is C. E. Hallenborg, formerly assistant chief of the branch. Mr. Hallenborg, is vice-president of the Dictaphone Corp.

Steel Shipments at Record for April

• • • **Shipments of finished steel products by subsidiary companies of the United States Steel Corp. for April totaled 1,758,894 net tons and compare with 1,780,938 net tons in March, a decrease of 22,044 net tons, and with 1,687,674 net tons in the corresponding month in 1941 (April) an increase of 71,220 net tons.**

For the year 1942 to date, shipments were 6,895,312 net tons compared with 6,638,945 net tons in the comparable period of 1941, an increase of 256,367 net tons. April shipments were the highest on record for that month.

Replacing Drafted Men Problems at Buffalo

Buffalo

• • • **Replacement** of steel workers drafted into military service has become a headache for the steel industry here. One man out of every 12 in three Buffalo plants has entered military service. The calling of additional men will create more problems.

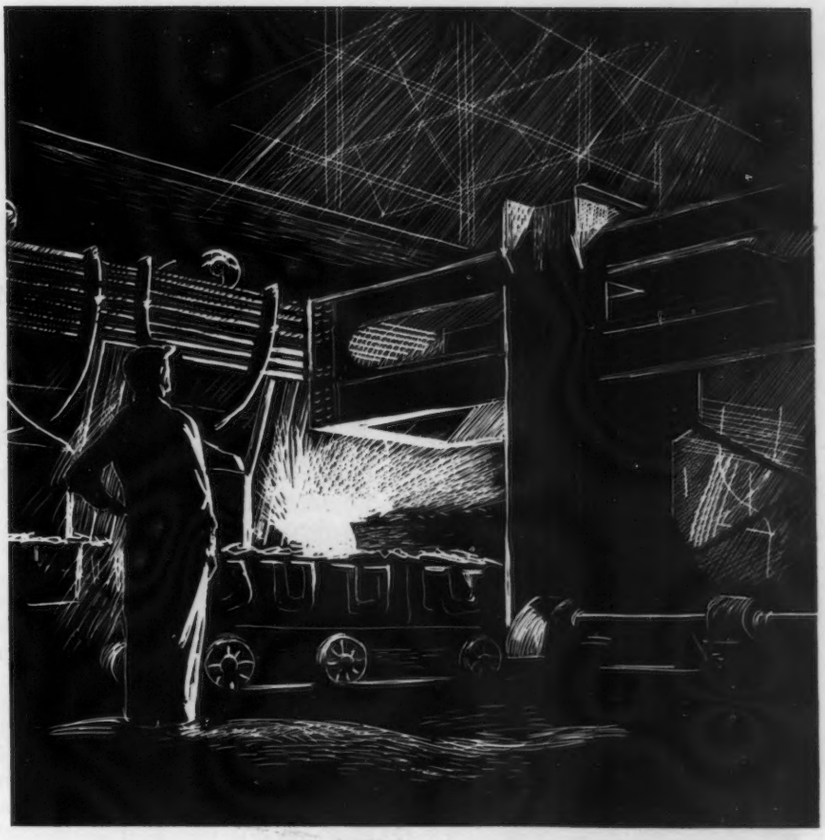
At the Lackawanna plant of Bethlehem Steel Co., approximately 1100 workers have entered the service. At Republic Steel Corp.'s Buffalo plant, 147 have gone to war. Wickwire-Spencer Steel Corp. reports 200 of its workers have entered military service.

Because of its long-range job-training program, the Bethlehem plant is said to have felt the loss of manpower less than the other two. Republic has been affected by the loss of its skilled laborers and has adopted the policy of asking for occupational deferments.

Shortages Suspend Enlarging Of Sheet & Tube Furnace

Youngstown

• • • **Difficulties** in securing materials have forced Youngstown Sheet & Tube Co. to suspend temporarily plans for enlarging one of its Campbell blast furnaces to offset the scrap shortage in this area. Deliveries of structural steel and steel plate are also interfering with work on a sintering and ore-treating plant. Both delays will prevent the company from increasing its pig iron output for 90 days or so.



Standard is helping the railroads do **THE BIGGEST JOB** *in railroad history*

On many of the locomotives which, today, are hauling the largest tonnage in history, there are tires, steel wheels, springs, axles, crank pins, connecting rods, piston rods, driving wheel centers, and many other parts made by Standard.

Back of each of these Standard products there is 147 years of steel making experience.

Acid open hearth steel is produced in Standard's furnaces under the control of trained metallurgists. Rigid control is exercised over every manufacturing process. A complete, modern testing laboratory is constantly engaged in research and routine tests to make sure that each Standard product *always* meets your specification.

FORGINGS • CASTINGS • WELDLESS RINGS • STEEL WHEELS

STANDARD STEEL WORKS

DIVISION OF
THE BALDWIN LOCOMOTIVE WORKS
PHILADELPHIA

gain hours

Use Laminum shims to reduce parts machining for easier work tolerances in factory adjustment! More machine hours released for production.

Laminum shims (.003 or .002 inch precision laminations bonded into a solid unit) are cut to your specifications.

Stock shim materials obtainable from mill supply distributors. (Write us for sample and illustrated shim application chart.)

Laminated Shim Company
Incorporated
76 Union Street Glenbrook, Conn.

it's
LAMINUM
TRADE MARK
THE SOLID SHIM THAT peels FOR ADJUSTMENT

1812

Metal Trades Group To Meet May 19, 20

• • • **Following** is the program for the forty-fourth annual convention of the National Metal Trades Association in the Biltmore Hotel, New York, May 19 and 20.

May 19: Report of president A. H. Timmerman, Wagner Electric Corp., St. Louis; "How to Supervise to Build Morale," Dr. Donald A. Laird, Rivercrest Laboratory, Middle Haddam, Conn.; "Production in the Aircraft Industry," J. Carlton Ward, president, Fairchild Engine Airplane Corp.; luncheon speaker, H. V. Kaltenborn, news commentator; "Citizenship in a Crisis," Dr. Pierce Harris, first Methodist Church, Atlanta; panel discussion, "How We Train For National Production," W. W. Finlay, Wright Aeronautical Corp., Cincinnati, Paul E. Heckel, Cincinnati Bickford Tool Co., Cincinnati; William L. Dolle, Lodge & Shipley Machine Tool Co., Cincinnati; K. R. Wood, Union Special Machine Co., Chicago; S. B. Taylor, Reliance Electric & Engineering Co., Cleveland, and William A. Ruhl, Universal Winding Co., Auburn, R. I.; "The Challenge that is America," Robert Kazmayer; dinner speaker, Hatton W. Sumners, member of Congress from Texas, "The Constitution and the Future."

May 20: "Employer Employee Cooperation," Joseph E. Moody, Hat Corp. of America, South Norwalk, Conn.; "How to Lick the Japs," Dr. No Yong Park, State Teachers College, Kirksville, Mo.; "Wage Negotiations," C. J. Uhlir, director of industrial relations, National Metal Trades Association, Chicago; "How to Set Up and Operate a War Production Board Joint Labor Management Committee," George A. Seyler, Lunkenheimer Co., Cincinnati, and John B. Goss, Scovill Mfg. Co., Waterbury, Conn.

SWOC to Become "United Steel Workers of America"

Pittsburgh

• • • **When the SWOC passes** from an organization setup to a permanent organization at the May 19 convention in Cleveland, it will blossom forth as the United Steel Workers of America, affiliated with the CIO and carrying an abbreviation, USA. Origin of the new name was credited to Philip Murray, SWOC chairman, who recently claimed a membership for his organization of close to 700,000.

Consolidation of the Amalgamated Association of Iron, Steel & Tin Workers with the autonomous steel union will also take place during the convention, this having been voted upon by the old Amalgamated, which, incidentally, has been used as the vehicle for granting charters to the SWOC lodges.

As forecast in THE IRON AGE recently, the SWOC and U. S. Steel Corp. subsidiaries have agreed upon consent elections for the purpose of determining if the

SEA EGG: This mine, dropped by a British minelayer, is shown as it hit the water. Day and night minelayers carry out these duties to safeguard the shores of England.

Acme Photo

union has exclusive collective bargaining power. Elections were held early this week at Columbia Steel, certain plants of American Bridge Co., Virginia Bridge Co., Universal Atlas Cement Co., and Scully Steel Products. Observers look for SWOC to have gained a majority of the votes in these elections. Others will be held later in the month.

The coming SWOC convention is expected to widen the reported breach rift between Philip Murray and John L. Lewis. Earlier reports had indicated the possibility that Philip Murray might step down from the SWOC chairmanship or presidency on the basis that his duties as CIO president would take all of his time. However, more recent developments involving the effort of John L. Lewis to oust Murray as a paid officer from United Mine Workers may result in Murray being elected as head of the permanent steel union.

Thompson Products Expects To Double Employment

Cleveland

• • • **Thompson Products, Inc.,** and its subsidiary, Thompson Aircraft Products Co., are expected to double the number of their present employees when production will reach its ultimate peak, according to Roy E. Bender, superintendent of training. He pointed out that the company's women workers operating turret lathes and other machine tools show favorable comparison with the output of male operators of similar machines. A major problem of the company at present is the threatened loss of many employees to the draft, and the necessity for training workers to replace these men. Fortunately, the company has developed training courses which permit new men to learn simple jobs in from 5 to 6 days, and make possible the training of turret lathe operators within two months.

Thompson's employees now are working on a three 7½-hr. shift basis, seven days a week, except for female employees who only work six days weekly. Employees may secure "off" days when requested, although Mr. Bender reports that such requests have been comparatively infrequent.

Chain Blocks

LOW FIRST COST
LOW MAINTENANCE

FORD TRIBLOCS are ideal for hard, constant, fast usage. They are low in first cost—*extremely* low in maintenance. They are fast and smooth in operation, always available for use on the instant. The **FORD TRIBLOC** is a quality spur-gear hoist, made throughout of high grade drop forgings and malleable castings of certified grade. Capacities: ¼ to 40 tons.

FORD SCREW HOISTS are light in weight, readily portable, yet ruggedly efficient. Made on the worm and screw reduction, they afford smooth, dependable service. Safety is an inbuilt quality of this handy, reliable tool. Capacities: ½ to 10 tons.

FORD DIFFERENTIAL HOISTS. The most simply constructed of all **FORD HOISTS.** Designed for light service where speed, portability and price are factors. High quality parts are used in its manufacture as in the manufacture of the more powerful hoists. They are subjected to the same rigid tests as all **FORD HOISTS** before shipment. Capacities: ¼ to 2 tons.

FORD TROLLEYS. Equipped with Timken Tapered Bearings. Although of heavy, rugged construction these trolleys are flexible enough to operate smoothly around very small radius curves. They run so easily that an 11-pound push moves a one-ton load along the I-beam track. Capacities: ¼ to 40 tons.

Order from Your Distributor

FORD CHAIN BLOCK DIVISION

Philadelphia, Chicago, San Francisco

In Business for Your Safety

ACCO

AMERICAN CHAIN & CABLE COMPANY, Inc.

BRIDGEPORT • CONNECTICUT

● **Tough Alloy, Steel Body — High Speed, Steel Edge — Patented Electric Weld**

If you want uninterrupted production . . . use these patented composite blades that cannot break . . . that stand up to the highest speed and heaviest feed any hack saw can attain . . . the positively unbreakable hack saw blades with the longest cutting edge—High Speed Steel.

Sold by Industrial Distributors everywhere

ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"
5700 BLOOMINGDALE AVENUE CHICAGO, U. S. A.
Eastern Sales Office: 225 Lafayette St., New York

STANDARD
S.A.E. ALLOY STEELS
IN STOCK

For those who prefer standard numbered steels we have

2315	3140	X4130 (Aircraft)
4615	3145	X4340 (Aircraft)
4615 (Elec. Fur.)	X4340	2330 (Aircraft)
3130	6145	4140
3135	6150	4150

For those who wish to take advantage of constant metallurgical improvement and development long before they are incorporated in S.A.E. standards or where close selection of material for analysis, grain size, control and quality is desired, we offer

ALLOY HY-TEN **GRADES**

THE HY-TEN OF TODAY IS THE STANDARD STEEL OF TOMORROW

"A" IX	"B" 2	"B" 4	"B" 43
"A" 15	"B" 3X	"B" 5	"M" Temper

Rounds Squares Flats — **BARS and FORGINGS** — Hexagons Octagons

Warehouses CAMBRIDGE CLEVELAND CINCINNATI CHICAGO

WHEELOCK, LOVEJOY & CO., INC.

Warehouses DETROIT NEWARK BUFFALO

4 Months' Output Of Steel Gains 4%

• • • **Production of** 7,122,313 tons of steel ingots and castings during April, as announced by the American Iron & Steel Institute, brought total steel output in the first four months of this year more than 4 per cent over the tonnage produced in the corresponding period of 1941.

The total for the first four months of this year was 28,161,202 tons, compared with 27,030,888 tons in the corresponding months of 1941. Production in April this year exceeded by almost 5½ per cent the total of 6,754,179 tons of steel produced in April a year ago.

Production last month was slightly below the record output of 7,392,911 tons achieved in the longer month of March.

An average of 1,660,213 tons of steel was produced per week during April, only one-half of one per cent below the peak of 1,668,829 tons per week produced in March. In April a year ago, an average of 1,574,401 tons of steel was produced per week.

During the past month the steel industry operated at an average of 97.7 per cent of rated capacity, as against 98.2 per cent of capacity in March. In April, 1941, the industry operated at 97.6 per cent of a considerably smaller total capacity than is available today.

'41 Steel Shipments 62 Million Tons; Pig Iron 55 Million

• • • **Almost 227,000,000 tons** of raw materials, excluding ferro alloys and alloying elements, were charged into American blast furnaces and steelmaking furnaces during 1941, according to the American Iron and Steel Institute. Total shipments of finished steel products from steel plants to consumers were about 62,300,000 tons.

Three-quarters of the raw materials consumed went into the industry's blast furnaces. In the production last year of 55,101,000 tons of pig iron, 172,300,000 tons of raw materials were consumed, including almost 94,600,000 tons of ore, nearly 48,000,000 tons of coke, 19,900,000 tons of limestone, 2,100,000 tons of scrap, and 7,700,000 tons of cinder and mill scale.

Nearly 47,400,000 tons, or over 85 per cent, of the pig iron pro-

duced was charged into steel furnaces. Most of the remaining pig iron was used by foundries which are not connected with the iron and steel industry proper. Nearly 42,000,000 tons of scrap iron and steel were consumed in the steel furnaces, along with approximately 5,000,000 tons of iron ore, 6,700,000 tons of fluxes, chiefly limestone, and more than 600,000 tons of iron in the form of cinder, will scale and sinter. Scrap amounted to 45 per cent of the steel furnaces' metallic raw materials.

Chicago District War Output Far Surpassing World War I's

Chicago

• • • **More than** 25 per cent more trench mortars have been produced in the Chicago Ordnance District in World War II than in all of World War I, Col. Donald Armstrong, chief of the district, told the Chicago Army Ordnance Association. In this war, manufacturers in this district have already turned out nearly two and one-half times as many field artillery guns as were made in the entire last war, he said. More gun carriages of a more intricate type have been shipped. Soon, the district will be making more tanks and tractors in one month than were produced in this area in all of the last year.

Col. Armstrong also said that contracts let in this district now total more than $2,200,000,000 compared to $450,000,000 in the previous conflict. More than 4200 employees now work for Army Ordnance here, over 1000 more than 23 years ago. Contracts released here to date average $52,232.29 per sq. mi. contract burden, compared to a 1918 figure of $759. Today's figures are equivalent to $117.28 per capita for the population of the district.

Canadian Gun and Shell Outputs Reach New Highs

Toronto

• • • **Production of** anti-aircraft and anti-tank guns in Canada during March established a new record, C. D. Howe, Minister of Munitions and Supply, has announced. He said that output in several instances is now months ahead of schedule and revisions of peak estimates have been necessary. He added that four munitions plants have started production on three calibers of anti-tank and one caliber of tank shells. Shells now are being made in Canada in 18 different types.

Training Speed-Ups Shown in Illinois

Chicago

• • • Where it formerly took 20 days to teach a novice the work of a spray gun painter, the instruction period now lasts only six days. Riveters are being trained in one-fourth the time previously required. These examples of speed-ups in training as a result of the Training within Industry Program in Illinois were cited by Walter C. Baker, personnel director of The Whiting Corp. There are now 1526 men instructing supervisors, foremen and other group leaders in 10 hour courses held right in the individual plants in the art of instructing rank and file workers for war-time jobs. This group of "super-trainers" will soon be increased to over 2000, Baker said.

Metal Working Machinery Output 55% Over 1941 Rate

• • • **The value of** new machine tools, presses and other metal working machinery shipped during March was $108,600,000, an increase of 73 per cent over March, 1941, it was announced last week by William H. Harrison, director of production of the War Production Board. Shipments of machine tools alone mounted to 24,300 units, with a value of $98,400,000. During February, 20,307 units, valued at $84,355,000 were shipped. "Last year the value of metal working machinery was about $840,000,000 and the present rate of $1,300,000,000 a year represents an increase of 55 per cent," Mr. Harrison said.

Most Beautiful Steel Bridges Are Selected

• • • **The Fourteenth Annual** Awards for the most beautiful bridges built of steel during the year have been announced by the American Institute of Steel Construction as follows: Most beautiful monumental bridge: Rainbow Bridge over Niagara River at Niagara Falls; most beautiful small bridge: Fairmount Boulevard Bridge, Cuyahoga County, Ohio; most beautiful movable bridge: Passaic River Bridge, Kearny, N. J.

New Definition of Warehouses Urged

• • • **A better definition** of warehouses is needed for operation under the current priorities setup, members of the American Steel Warehouse Association Inc., were told at their annual convention in Chicago Tuesday, May 12, by President-Secretary Walter Doxsey.

"It is neither effective nor efficient for steel producers to supply nearly twice as many outlets as were recognized before the war," he said, after pointing out that the present definition whereby a warehouse is any person who receives physical delivery of steel from a producer and resells it in the form received, had brought into the warehouse picture a number of companies normally not considered steel distributors.

Another thought brought out by Doxsey at the opening of the two-day 33d annual convention in the Drake Hotel was whether it might not be necessary to harmonize warehouse quotas more closely with actual war demands.

"New war plants and the conversion of existing plants to serve the war program have doubled and trebled warehouse demand in some areas," he said. "Yet, the quotas of these distributors remain the same as they were twelve months ago when present requirements were non-existent. The same discrepancy is true of other products."

He continued: "Unless the distribution of steel through warehouses and other secondary outlets is streamlined as have been many other industries and distributing services, I fear very much that the military authorities may step in and establish their own warehouses. A few of you with your plants may then be chosen, and the rest of you can go hang. We all know that the Army and the Navy, the Maritime Commission, all manufacturers of war goods, utilities, public services and other essential enterprises need warehouse stocks and need the competent services established warehouses can give them. We know, too, that all these can best be served by the maintenance of well-rounded stocks in these established warehouses, rather than by setting up a few warehouses here and there to serve the Army and some others elsewhere to take care of the Navy.

"We need not look far for evidence of this trend, or possibility. The small arms unit of the Army has acquired a large warehouse at Rochester, in which will be stocked production steels for arms contractors. We are advised that this particular function is one no commercial steel warehouse could perform. I hope that is true. Nevertheless, the Army now has one steel warehouse and a precedent dangerous to all of you has been established.

"Other troubles can be traced to this definition. In the product classifications that were established when M-21 and M-21-b were introduced, primes were not differentiated from rejects, seconds, wasters and fishtails. Thus, two entirely different distributing functions were thrown together, and it is exceedingly difficult to

Tiny Robot Sentries

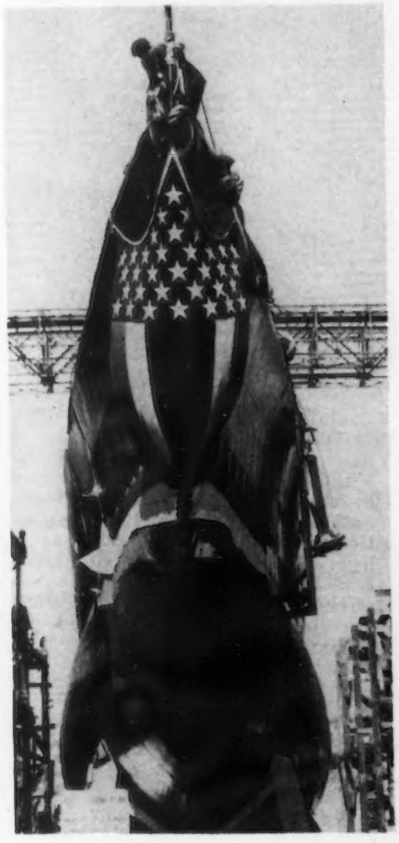
Guard GREAT INDUSTRIES

● Supplying the most dependable protection yet devised for safeguarding great American industries, A.A.I. Automatic Alarm Systems now aid human guards in patrolling miles of high wire fence enclosing important plants and properties. Tiny "robot sentries," or detectors, attached at intervals along the line of fence, serve as supersensitive "ears" in detecting, amplifying and reporting sounds by both visible and audible signals. As little as the touch of a human hand is sufficient to set the alarm in operation and at the same time identify the section of fence from which the alarm originates. A.A.I. Automatic Alarm Systems provide efficient, 24-hour-a-day protection, even during times of blackout, storm and fog when other alarm devices are practically useless. These systems may be installed by plant engineers, require little or no servicing and are available at a cost permitting even small factory installation. Literature is available.

Licensed under DuPont and Astatic Patents

AUTOMATIC ALARMS Incorporated

831 Market St. YOUNGSTOWN, OHIO, U. S. A



AP Photo

HEADED FOR JAPAN: Adding to the Navy's undersea strength, the sub U. S. Sunfish, was launched at Mare Island Yard, in San Francisco bay area on May 2. The launching was eight months ahead of schedule.

conjure a practical formula that meets the requirements of both.

"Primes, seconds, and rejects, sorted as to gauge and size, come under M-21-b and are a part of your quota. Wasters, fishtails and crop ends do not. It has been possible for you to buy them without a rating and you could sell them without a rating. So could anybody else, whether he had a certificate under M-21-b or not, or whether he had a warehouse or not.

"Effective May 15, Amendment No. 3 and Extension No. 2 to M-21, the general steel mill order, prohibits the sale by producers of any steel without a rating of A-10 or better. All the warehouses operating under M-21-b have a rating; they can buy this off-grade material. But numerous companies that have been handling this off-grade material have no rating. Unless some action is taken, they will be put out of business. It might be possible to give them a quota based upon their sales of these fishtails and whatnots during the first quarter of 1941 and thus bring them under M-21-b.

"However, many of you have been buying a considerable tonnage of this material during the past six months. You have no quota, and if you are required to establish a quota on the basis of your sales of wasters and like material during the first quarter of 1941, that quota will be exactly nil in most instances.

"Brokers, without warehouses, have also been selling considerable tonnages of these Orphan Annie products. On May 15 a rating of A-10 is needed to purchase them. They have no rating. What happens to them. Let them extend the ratings of their customers to get this steel? Well, if that is permitted, it is a privilege you are denied. Warehouses under M-21-b must make shipments of steel from their stocks before they can extend ratings."

Already figured and charted for you in this catalog are the maximum hydraulic cylinder stroke lengths that can be used with the standard diameter piston rods. If this stroke length does not accommodate the job to be done, an alternate choice piston rod is given with the maximum stroke that can be used for that diameter piston rod.

Along with information of equal importance to the user of hydraulic cylinders, this chart is shown in our Catalog H-40. Your copy will be sent promptly on receipt of your request.

THE TOMKINS-JOHNSON CO.

628 NORTH MECHANIC STREET · · · JACKSON, MICHIGAN

TUFFERNELL IS THE RIGHT WORD FOR THE RADIO-FREQUENCY TESTED INSULATION IN WESTINGHOUSE CS MOTORS

—IT'S JUST ONE OF THE FEATURES THAT KEEP 'EM YEARS AHEAD!

J-21239

WESTINGHOUSE

SEE PAGE 6 AND PAGE 7

Adams Says New Plate Mills Could End Shortage

Washington

• • • **C. E. Adams, chief** of the WPB Iron and Steel Branch, said last Friday that permanent solution of the plate shortage could only be solved by new plate mills coming into operation. However, Mr. Adams said that the shortage is being eased slightly by increasing production, particularly from strip mills.

Shipments for April were 895,971 tons, as compared with 878,726 in March, the previous record.

"For the second successive month," Mr. Adams continued, "shipments on Maritime Commission orders met the tonnage asked. The total for the month was in excess of 280,000 tons."

"The pressing problem of the Maritime shipbuilding program is to have the right plates at the right yard at the right time. Problems of ordering and scheduling to insure this insofar as possible now are being worked out between WPB and the Commission.

"The ideal solution, of the problem would be to have a backlog of all types of plates on hand at each shipyard. To do this, it would be necessary to curtail shipments to the Army, the Navy, the railroads, and for construction of hundreds of war plants now going up in all parts of the country. With demand for plates far in excess of supply, any such curtailment would delay other important phases of the war effort."

Austin Men Get Output Bonus

Cleveland

• • • **For a record** of 1800 tons of structural steel fabrication during April, bonus checks and service pins have been awarded 88 men of the Austin Co. steel fabricating shop. April output was 78 per cent above the average monthly production last year, announced George A. Bryant, president of the company.

Ohio Plant Plans Expansion

• • • **The Commercial Shearing** & Stamping Co. will undertake a $500,000 expansion program to aid its conversion for war work. The one story plant will be approximately 146 x 300 ft., one story high, and is tentatively planned to have a steel frame structure.

Wide World Photo

PLASTIC PLANE PONTOONS: A new method of molding plastic without heat or pressure, developed by the Crosley interests of Cincinnati, is said to permit the construction of plane pontoons that are as light as those made of aluminum, cost only half as much, are as strong, and permit quicker take-offs by eliminating drag caused by rivets and seams.

Schoenlaub Named WPB Official

Washington

• • • **Appointment of** Charles M. Schoenlaub as acting chief of WPB's Production Requirements Branch was announced Sunday by C. H. Matthiessen, Jr., chief of the Bureau of Priorities. Mr. Schoenlaub joined the Office of Production Management on July 31. Since March 15 he has been special assistant to A. L. Williams, chief of the Production Requirements Branch, and will serve as acting chief of the branch because of the illness of Mr. Williams.

Before coming to Washington, Mr. Schoenlaub was assistant superintendent of the open hearth department, Republic Steel Corp., Cleveland.

Auto Sales Slow; Buffalo Supply Ample For 2 Years

Buffalo

• • • **There are enough** new automobiles in Buffalo's frozen stock of cars to last at least two years at the present rate of rationing, it was revealed here this week. To date not more than 450 cars have been sold since the freezing date. There still are about 3000 new cars stored in warehouses here, according to the Buffalo Automotive Trade Association.

Japan's Kobe Steel Works Announces Expansion

• • • **Japan's Kobe** Steel Works, according to *The Metal Bulletin*, London, proposes to extend its plants considerably. The company will in future mainly concern itself with the production of steel, shipbuilding material and electrically operated tools. The partial conversion of the plant for the manufacture of light metals is also envisaged. The company provides for a doubling and even trebling of the previous capital.

Nippon Seitetsu Kaisha, Japan's biggest iron and steel concern (in which the state holds 60 per cent of the basic capital), has announced a far-reaching reorganization scheme. The president of the concern is the former foreign minister, Mr. Toyoda. It is proposed to introduce the "Leader Principle" in the administration of the concern, which operates works in all parts of Japan and China and produces about 90 per cent of Japan's pig iron, over 50 per cent of semi-finished and over 40 per cent of the steel production. The employees are to be invited to make suggestions regarding improvements in operations.

For location of this and other Japanese industrial plants, see The Iron Age war industry map in the April 30th issue.

WPB Reorganizes Regional Board

Philadelphia

• • • **Complete reorganization** of WPB activities in Eastern Pennsylvania, Southern New Jersey, Delaware, most of Maryland and Virginia has been announced by regional director Orville H. Bullitt.

The reorganization, in line with increasing decentralization of all but policy-making functions of WPB, includes the appointment of three new deputy directors. Deputy director in charge of administration will be Edward H. York, Jr., partner in Morgan Stanley & Co. H. W. Prentis, Jr., president of Armstrong Cork, and former head of the N.A.M. will be in charge of production. The former chairman of the board of Day & Zimmerman, Nicholas G. Roosevelt, will head up the planning division.

They Sharpen The Tip
OF A WARBIRD'S BEAK!

Air *hits hard* at 350 miles an hour. So engineers give some types of fast warplanes a sharp air-cutting nose. To airmen these pointed covers for the propeller's gears are known as "spinners."

ARMCO Cold Rolled sheets are used for this job on many of America's best fighting planes. Spinner adapters keep dirt out of vital gears and insure a smooth, even flow of air around the fuselage. They complete the streamlining that adds to the swiftness of our sky fighters.

ARMCO Cold Rolled gets the call for adapters because it gives top prime-yield despite severe fabrication. It also provides a dense and uniformly smooth surface.

The exceptional forming qualities of ARMCO Cold Rolled sheets serve well for many other war products. These include troop-carrying trucks and combat cars, parts for ships, mess equipment, powder cans and land mines. Are you making war equipment that could be produced faster and better with this deep-drawing, smooth-finished sheet? Write for information. The American Rolling Mill Company, 1891 Curtis St., Middletown, Ohio.

ARMCO ARMCO **COLD ROLLED STEEL**

Conco Torpedo Electric Hoist

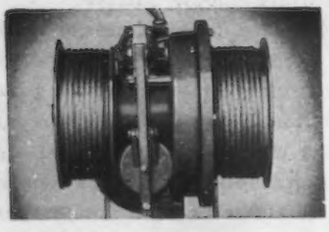
Double Drum Construction — Push Button Control — Electric Solenoid Brake

Hook, Bolt or Trolley Suspension — Anti-Friction Bearings — Enclosed Gearing.

Only $139.50
FOR 250 - LB. CAPACITY

America is racing against time. Minutes count! And the Conco Torpedo Electric Hoist can save precious production minutes. Push Button Control, Limit Switch, Electric Brake, Enclosed Mechanism are all features which contribute to faster, safer, more effortless operation. The Conco Torpedo Electric Hoist is available in 250-Lb. capacity—$139.50; 500-Lb.—$149.50; 1000-Lb. — $159.50. And the simple, heavy construction of this hoist —employing only two gear reductions— means a long lived investment! Write for complete details.

SIMPLE HEAVY CONSTRUCTION



Illustrating Conco's double drum construction. Cast iron drums are 30 times diameter of plow steel cable. Load is better balanced; full lift is obtained without overlap of cable.

CONCO
ENGINEERING WORKS
ORANGE DEPT. — MENDOTA, ILL.

For more than 20 years builders of hand-powered and electric cranes, hoists and trolleys.

New Exceptions to Steel Price Schedule Are Granted by OPA

Washington

• • • **OPA on Monday** granted certain exceptions from the terms of Price Schedule No. 6, the steel price order, to the following list of companies:

South Chester Tube Co., Chester, Pa.; Sheffield Steel Corp., Kansas City; Colorado Fuel & Iron Corp., Denver; Seneca Iron and Mfg. Co., Fostoria, Ohio; Follansbee Steel Corp., Pittsburgh. The exceptions were granted under a provision of the schedule which provided that OPA may give producers relief from excessive or unusual freight absorption resulting from war orders or allocations.

The following reasons were assigned by OPA for granting the exceptions:

South Chester Tube Co. has been required to ship to the Pacific and Gulf Coast by rail. This not only eliminates any freight advantage but also entails unusual freight absorption against the Pittsburgh basing point.

Sheffield Steel Corp. and Colorado Fuel & Iron Corp. have been granted release on lend-lease shipments which otherwise would have had to be priced on the Chicago basing point. Since both of the mills are located considerably west of Chicago a large amount of freight would have had to be absorbed.

Seneca Iron & Mfg. Co. was granted permission to pass on certain charges arising out of freight difficulties of wire deliveries to the lend-lease administration. Follansbee Steel Corp., a producer of carbon steel forging quality billets by high cost process was permitted to increase the price of billets.

↓ ↓

Government Contracts

• • • **Effective date** of the General Maximum Price Regulation with respect to Government contracts is postponed from May 11, 1942, until May 18, 1942, under Supplementary Regulation No. 2, Price Administrator Henderson announced May 11. After May 18, 1942, contracts with the Government must be entered into at prices not topping applicable maximum prices. Deliveries remaining to be made under government contracts made prior to May 18, 1942, may continue to be made at contract prices until June 15, 1942.

The supplementary regulation also exempts machines and parts and machine work from provisions of GMPR. These items are subject to provisions of Maximum Price Regulation No. 136, which does not become effective until

ARMORED TRUCK: This is one of the new half-tractor, armored reconnaissance trucks used by the Army. The machine guns mounted behind the cab provide plenty of protection for the truck and crew.

Harris & Ewing Photo

May 18, 1942. It is undesirable, OPA indicated, that such machines and parts and machine work shall become subject to GMPR between May 11 and May 18. Hence, the exemption from GMPR, which is contained in the supplementary regulation.

Machine Tool Exception

Washington

• • • **The Defiance** Machine Works, Inc., Defiance, Ohio, on Monday was permitted by OPA to sell 150 machines manufactured by a subcontractor, the Haughton Elevator Co., Toledo, at specified maximum prices.

Permission was granted in Amendment No. 9 to Revised Price Schedule No. 67 which substitutes the Haughton Elevator Co. for the Power Gates Co. When Amendment No. 5 was issued, no formal agreement had been executed by Defiance with the Power Gates Co. for the manufacture of the machines. Thereafter, it was learned by Defiance that the Power Gates Co. would be unable to meet the required delivery dates.

Copper Scrap Premiums

• • • **Special purpose** premiums granted to certain users of copper scrap by Order No. 1 under Revised Price Schedule No. 20 (Copper and Copper Alloy Scrap) were revoked May 11. The revocation becomes effective May 21, 1942.

The special use premium of 1¼c. per lb. may be paid only if the following conditions exist:

(1) The scrap has been prepared to meet the consumer's specifications and is suitable for his direct use without further preparation, and

(2) The scrap is not sold or delivered to a copper refiner, a brass and bronze ingot manufacturer, a ferrous or non-ferrous foundry, or a brass mill.

Companies named in Order No. 1 will be permitted, by the new provision, to pay the same 1¼c. per lb. premium above the price of No. 1 copper scrap as they were permitted to pay under the "special purpose" provisions of Order No. 1.

Installed Machinery Prices

Washington

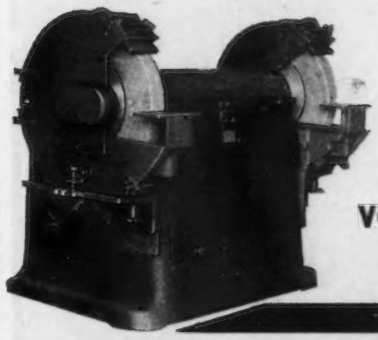
• • • **Manufacturers who** sell machinery on an installed basis may calculate prices of installation on the basis of March, 1942, rates for field labor and outbound freight, instead of Oct. 1, 1941,

THE MARSCHKE LINE

The Right Grinding Wheel

For real grinding efficiency pick the right grit, grain and bond and run the wheel at the proper speed! But even these essentials won't give acceptable grinding costs without true, smooth wheel rotation developed by rigidly supported spindles.

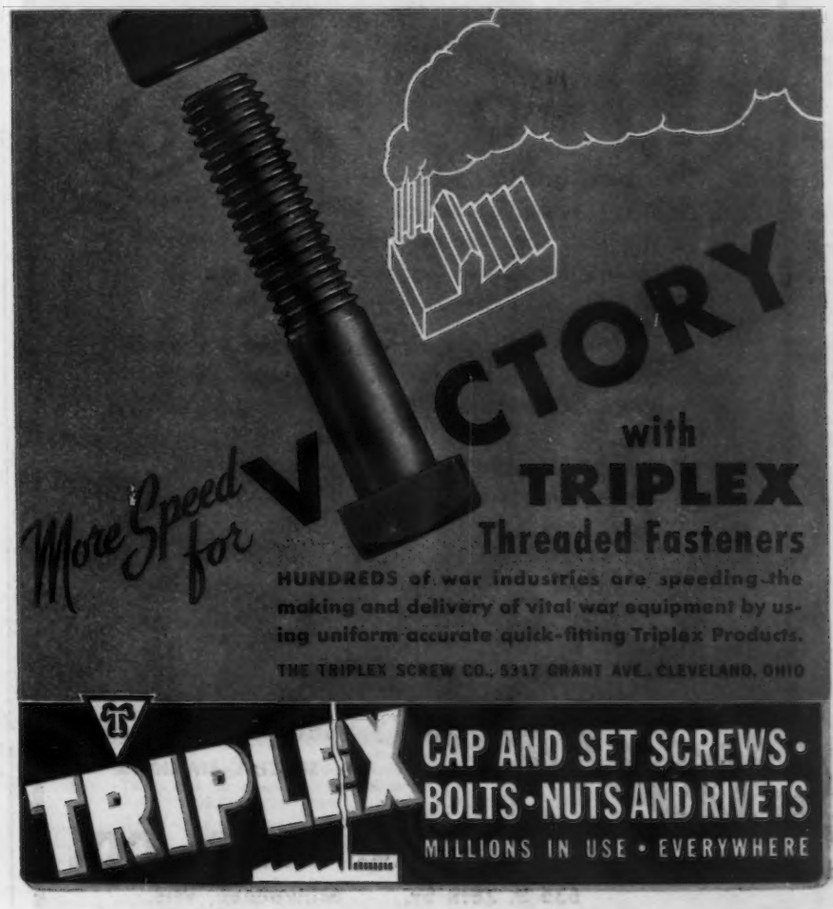
You will get the best offhand grinding results with dependable Marschke Grinders. Built to machine tool standards, Marschkes do the work and spare the wheel. It makes no difference whether you need a 1HP pedestal machine for tool grinding, or a 25HP floor stand or swing frame snagger—there is a Marschke for your particular requirement. Marschkes will do *your job* more efficiently than any other machine of similar type—and save you money.



Send for Catalog showing over 70 specifications of Marschke Grinders and Buffers. Write to

VONNEGUT MOULDER CORP.

1843 Madison Ave., Indianapolis, Ind.


More Speed for VICTORY
with
TRIPLEX
Threaded Fasteners
HUNDREDS of war industries are speeding the making and delivery of vital war equipment by using uniform accurate quick-fitting Triplex Products.
THE TRIPLEX SCREW CO., 5317 GRANT AVE., CLEVELAND, OHIO
TRIPLEX
CAP AND SET SCREWS • BOLTS • NUTS AND RIVETS
MILLIONS IN USE • EVERYWHERE

rates, OPA said last Friday in an amendment to Maximum Price Regulation No. 136, on machines and parts.

The equipment must be priced at October levels; it is only the costs of installation which may be computed on the March basis, it was explained. the amendment also permits resellers of machinery who made price increases during the month of October, 1941 designed merely to offset increases in prices to them effected in September, to retail such increases in prices to the extent necessary to maintain the same percentage of mark-up. As a condition to such increases, detailed reports of the mark-ups must be made to the OPA.

The original intention that discounts and other allowances in effect Oct. 1, 1941, cannot be reduced or discontinued, was made clear by the amendment. A second amendment to Regulation No. 136, to provide special treatment for government - authorized developmental and experimental contracts, is presently under consideration.

Meanwhile, Price Administrator Henderson cautioned machinery manufacturers against pricing their lines at levels higher than those prevailing on Oct. 1, 1941.

"Some confusion has arisen," Mr. Henderson declared, "by virtue of the fact that Maximum Price Regulation No. 136—covering machines and parts not covered by other price schedules—was issued as a companion measure to the General Maximum Price Regulation.

"The machinery regulation becomes effective May 18, 1942, the identical date upon which the 'overall' ceiling at the individual seller's highest March prices becomes effective at retail."

"The resemblance ceases here, however," the Price Administrator stated. "Some 90 per cent of the manufacturers producing machinery have been operating previously under a number of voluntary price control programs based on the Oct. 1, 1941, price level, or a closely comparable date. Hence, price levels in March, 1942, generally were the same as in October, 1941. However, there were some violators of the voluntary 'freeze letters.' Thus, establishing a formal price ceiling as of the March, 1942, level by permitting each seller to continue the prices he charged during March would reward those who had failed to cooperate, and, in effect, would discriminate against those who had cooperated. Therefore, it was decided to use October 1, 1941, as the base price date instead of March, 1942."

Furthermore, the OPA chief indicated that because of the amount and importance of "tailor-made" or "specially designed" products in this field, adequate regulation of machinery prices could not be achieved with the necessarily general language of the General Maximum Price Regulation. Machinery requires the use of problems raised by these non-standard products.

Mr. Henderson pointed out that 77 per cent of the industry's output is sold directly by manufacturers to users. Less than 3 per cent reaches the user through re-

GUARD against SABOTAGE with Stearns MAGNETIC PULLEYS

THE STEARNS POWERFUL AIR-COOLED MAGNETIC PULLEY

Tramp iron in any form in your coal pile, your product or wherever is a vulnerable spot for sabotage.

Constant vigilance against damage to crushers, grinders, pulverizers and other machinery, possible costly shutdowns, injuries to employes, can be maintained with Stearns Magnetic air-cooled (for more power) pulleys. Your best low expense, effective insurance.

In sizes to fit your conveying systems, your capacities, also in self-contained magnetic pulley separator units. Write for Bulletin 302.

We also produce a full line of magnetic separators of all kinds (Bulletin 115) and a complete line of magnetic power transmission control devices—clutches, clutch-brake combinations (Bulletin 225) and brakes (Bulletin 604).

Stearns

SEPARATORS DRUMS ROLLS
CLUTCHES BRAKES
SPECIAL MAGNETS

MAGNETIC MFG. CO.
635 S. 28th St. Milwaukee, Wis.

tail outlets. The 20 per cent remaining is marketed through distributors or jobbers, who act essentially as commission agents. Many of these products are specially engineered. "Shelf goods" are comparatively rare, and price lists and catalogs cover only a part of the products. Furthermore, many products are basic, entering into the production of essential military and civilian needs at a very early stage. In this respect, it was pointed out, machinery is comparable to a raw material. Therefore, it was necessary to place machinery in a separate regulation, with a basic ceiling date of Oct. 1, 1941.

Financial Reports Required

• • • **A general financial** reporting program designed to provide basic financial data necessary for studies of price control problems in many industries where adequate information is not now available has been instituted by Price Administrator Henderson.

Reporting forms and an instruction book requiring balance sheet and income account data are being sent to about 25,000 business corporations, with over $250,000 assets each, engaged in manufacturing, mining, construction, wholesale trade, retail trade and related fields.

The initial annual financial report (Form A) and the first interim or quarterly financial report (Form B) of companies using the calendar year basis must be filed with OPA within 30 days after receipt of the request. If the fiscal year to be covered by the initial annual report is other than the calendar year, the report must be filed within three months of the close of the fiscal year or within 30 days—whichever date is the later. All subsequent annual and interim reports are to be filed within three months and one month, respectively, after the close of the period covered. None of these reports need be certified by independent public accountants.

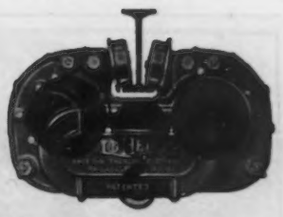
The 1940 corporation income tax returns show there were 69,000 companies, each having assets of $250,000 or more, and that 30,000 of these were in the wholesale trade or retail trade or in manufacturing, construction, mining, and agricultural fields. However, OPA pointed out, only about 2500 of these companies are required to file with the Securities and Exchange Commission.

Certain non-financial information is required in the annual reports, including disclosure of company control, identification of executives, importance of products, wage rates, raw materials prices, accounting policies, etc.

The reports will be checked and inaccuracies noted, it is said.

Handbook on Costs

• • • **A handbook** which explains principles for determining costs under government contracts has



BALANCE makes a difference in electric hoists

It is a fact that balance makes a startling difference in electric hoist design.

The Lo-Hed hoist is unusual in that its motor and drum are balanced around the beam. This means that the hook can be pulled up close to the beam—a desirable plus feature for which you pay no premium. Also, since motor and drum are parallel they can be connected through a train of efficient spur gears. The drum, motor and gearing are housed by easily removable covers.

Lo-Hed hoists have many other service and safety features, shown in the 28-page Lo-Hed catalog. No point of manufacture is more vital to you today than the precision with which Lo-Heds are built. Lo-Heds are as painstakingly made now as they were before the war. On past experience that means good service from a Lo-Hed years after we win. So get a Lo-Hed. Send for that catalog.

The Lo-Hed Hoist Is Applicable To Any Monorail System. There's A Balanced Lo-Hed Electric Hoist For Every Purpose

Look in your Classified Telephone Directory under "A-E-CO LO-HED HOISTS" for your nearest representative

OTHER A-E-CO PRODUCTS:
TAYLOR STOKERS, MARINE DECK AUXILIARIES, HELE-SHAW FLUID POWER

AMERICAN ENGINEERING CO.
2410 Aramingo Ave., Philadelphia, Pa.

☐ Please send me your complete catalog of LO-HED HOISTS.

☐ Ask your representative to get in touch with me promptly.

Name .....

Company .....

Street Address .....

City..... State.....

(Please print plainly)

just been prepared by the accounting advisory branch of WPB.

For some time costs under government contracts have been based on a decision of the Treasury originally issued to carry out the profit limitation provisions of the former Vinson-Trammell Act. This decision is known as TD 5000 and has been regarded by government departments as the most satisfactory existing definition of costs. The booklet just issued is not a revision or an interpretation of TD 5000 but explains in simple and complete terms the principles of costs as covered by TD 5000. Copies can be obtained from the Superintendent of Documents, Government Printing Office, Washington, for 10c. each.

Freight Charges Clarified

Washington

• • • **A Clarification** of the effect of the recent 6 per cent freight increase on the prices of iron and steel products under provisions of Price Schedules No. 6 and No. 49 has been made by OPA.

In general the rule is that the increased freight cost must be absorbed by the steel mill or the steel reseller on incoming shipments but may be added to outgoing shipments in cases where the freight is a component and declared part of the maximum price.

"The Jobber purchasing steel cannot in general reflect the increased cost to him in his resale price," said the OPA, "but on any sales made by the jobber on which less than carload or carload freight is a factor in the maximum delivered price the actual freight rate reflecting the 6 per cent increase may be used in arriving at the maximum delivered price.

"Further, where maximum prices under Price Schedule No. 49 are built upon a formula including a freight component, as in the case of merchant wire products and standard pipe the actual freight now being charged may be used in computation."

There are certain exceptions. Under Price Schedule No. 6 some prices are "arbitrary delivered prices" such as the delivered price applicable to Detroit and eastern Michigan. These may not be increased except as specified increases have been granted by Amendment No. 4 to Revised Price Schedule No. 6. Also, under Price Schedule No. 49 where the maximum delivered price is limited by the April 16, 1941 price of named sellers in a "listed city" it is not affected by the freight rate increase. It was emphasized that the interpretation does not apply under price schedules which used flat maximum delivered prices not built upon a formula in which freight is a factor.

Spar Ceiling Approved

• • • **As a whole,** fluorspar producers have no objection to the new OPA price ceiling, since it enables the industry to withstand increased costs for the most part. Details of the ceiling were published here last week. Demand for fluorspar has strengthened considerably, and the supply situation is expected to remain

Specialists in
OILPROOF
ANTI-CORROSIVE
WRAPPINGS

As the largest manufacturer of specialty packaging papers, we have long made anti-corrosive and oilproof wrappings for annular bearings and small machine parts.

Recently, at the request of firms in the aviation industry, we perfected a complete line of special anti-corrosive wrappings for the protection and long-term storage of all metal products.

These papers have proven anti-corrosive properties, combined with oilproofness, strength, pliability and moisture-vapor-proofness. They can be "tailor-made" to your specifications if necessary.

Write for Samples and Technical Bulletin No. 81

RIEGEL PAPER CORPORATION
342 MADISON AVENUE, NEW YORK, N. Y.
65

Revision Sheets for Price Guide Issued

• • • Copies of the Price Guide issued in February by THE IRON AGE are still available, brought up to date by revision sheets containing all the changes which have taken place since the Guide was first printed. The Price Guide may be obtained from the Reader Service Department, THE IRON AGE, 100 East 42d Street, New York, for 25c. apiece, up to 10 copies; 11 to 100 copies, 20c.; 101 to 300 copies, 18c. In ordering four copies or less, please send stamps or coin.

"tight" for some time, although no actual shortage appears in prospect. The steel industry, which normally consumes upwards of two-thirds of the total fluorspar used, is expected to require some 20 per cent more fluorspar this year than it did in 1941. The increase will be largely due to the change in open-hearth practice requiring a greater amount of this fluxing agent to offset the use of iron ore and larger amounts of iron in the steel melt because of an insufficiency of scrap.

↓ ↓

Scrap Copper Adjustments

• • • An increase in quantity premiums to ¾c. per lb. for shipments of 60,000 lb. of a single group of grades of copper scrap or copper alloy scrap is provided in Revised Price Schedule No. 20 as amended.

An increase to ½c. in quantity premiums for shipments of 40,000 lb. of two groups of grades is also provided.

The revision, effective May 11, also changes the special preparation premiums, includes a provision licensing dealers who sell to consumers and adds prices for six new grades—high-grade bronze solids and borings, high lead bronze solids and borings, bronze paper mill wire cloth and No. 1 tinned copper wire.

It also makes upward or downward adjustments in the base prices of all principal grades except refinery brass and automobile radiators, incorporates new consumer report forms and forbids payment of a quantity premium on material containing 10 per cent or more rejections.

The new preparation premiums are:

1. No. 1 heavy copper, No. 1 copper wire, No. 1 tinned copper wire in crucible shape or briquettes—1¼c. per lb. No. 2 copper wire or mixed heavy copper—1c. per lb. (These premiums may not be paid by a copper refiner or brass ingot maker.)

2. Copper scrap specially prepared for the direct use of any person except a copper refiner, brass ingot maker, ferrous or nonferrous foundry, or brass mill—1¼c. per lb.

3. Copper alloy scrap in crucible shape—1¼c. per lb. (This premium may be paid on either clean heavy scrap free of all harmful material and suitable for direct use by the consumer, or on turnings and borings of uniform content and completely free of impurities. It may not be paid by a copper refiner or a brass ingot maker.

Report forms 120:7a and 120:7b, which consumers are required to file, have been revised and included in the schedule.

Prices of all grades reflect a

VULCAN FURNACES

of the pier hearth type are designed not only to provide uniform heating, positive control and maximum fuel economy, but to accomplish these results in much less time. A reduction in the overall cycle of 35% and more is not exceptional . . . an important reason for the installation of VULCAN Furnaces in a number of leading war production plants.

The illustration shows a series of furnaces for the triple-treatment of high alloy steel castings requiring quenching. A Gantry Crane is used for handling. VULCAN Furnaces of similar type are adaptable for treating armor castings.

Custom-built Furnaces for All Heat Treating Operations. Write for Information.

VULCAN CORPORATION
NORTH 18TH & CHERRY STS., PHILADELPHIA, PA.

reduction of ¼c. per lb. to prevent the increased quantity and special preparation previous from raising the general level of prices to the consumer.

Prices of several items have been increased, partially offsetting the general ¼c. reduction, and some differentials have been revised. Among important grades receiving increases are bell metal, high-grade gears, babbit-lined brass bushings, rifle shells, brass pipe and Muntz metal and admiralty condenser tubes. The only price reduction of more than ¼c. is made for yellow brass castings, now priced at 6.75c. per lb. This reflects the recent decreases in other yellow brass items.

A standard of 10 per cent rejections has been established as the test of "good delivery." Lots containing more than 10 per cent rejections must be settled for at prices at least ¼c. below the maximum, or the entire lot paid for as though it consisted exclusively of the lowest-price grade contained. Rejections include scrap for which no specific maximum prices are fixed in the schedule, scrap having a different item number than the principal grade, having the same item number but the same or lower price, and high priced material having the same item number if paid for separately, as well as all material other than copper scrap or copper alloy scrap. Lots containing more than 10 per cent rejections may not be counted toward a quantity premium.

• Muffles • Retorts
• Boxes • Pots
• Rails • Grids
• Rolls • Tubes

MICHIANA
Heat-Resistant and Corrosion-Resistant ALLOY CASTINGS

• Sprockets • Chains
• Heat-Resistant and Corrosion-Resistant Castings of All Kinds

FOR GREATER WAR PRODUCTION

In the production of practically all essential machinery and materiel for our armed forces, heat treatment plays a vital part . . . For the furnaces and the handling of the work in the furnaces,—dependable long-heat-hour heat-resistant alloys are needed to insure maximum results.

It will pay you to replace parts where strains are heaviest and anticipate requirements. MICHIANA with 24 years of specialized experience in the production of heat-resistant and corrosion-resistant alloys, is ready to make recommendations that may save your time, and speed up essential production. MICHIANA PRODUCTS CORP., Michigan City, Indiana.

MP CORP.

Machines and Parts Prices

• • • **Allowance is made** by OPA for the addition of outgoing freight costs and labor costs (prevailing during March) on machinery or parts sold on an installed basis.

In Amendment No. 1 to Price Regulation No. 136, OPA also permits a dealer to use his established price in effect on Oct. 31, 1941, when such price was higher than that which he sold at on Oct. 1, provided that the increase was due to a higher price which the dealer was required to pay on the item between Sept. 1 and Oct. 1. An alternate pricing method is also prescribed. OPA requires the dealer to file a report covering any such increases.

Refrigerator Price Ceiling

• • • **Price Administrator** Henderson has placed a price ceiling, reflecting February, 1942, levels, on all sales of used mechanical household refrigerators.

Maximum prices in specific dollars and cents figures are listed for hundreds of second-hand refrigerators of all brands and models in the order—Maximum Price Regulation No. 139 (Used Mechanical Household Refrigerators). A formula to enable sellers to determine the price of a used refrigerator which may have been omitted from the long list is also provided by the regulation.

MRC Manganese Prices

• • • **The terms** under which Metals Reserve Co. will purchase domestic manganese ores include:

Quality: Purchases will be of three grades with the following specifications:

	"High Grade" Per Cent	"Low Grade A" Per Cent	"Low Grade B" Per Cent
Mn (Min.)	48.0	44.0	40.0*
Al (Max.)	6.0	10.0	No Max.
Fe (Max.)	7.0	10.0	No Max.
Ph (Max.)	0.18	0.30	0.50
Si (Max.)	10.0	15.0	No Max.
Zn (Max.)	1.0	1.0	1.0

*Under "Low Grade B", manganese ore will be accepted to 35.0 per cent minimum under penalties.

Price: Effective May 4, 1942, contracts will

be considered on the following schedule for domestic ores, within continental United States (excluding Alaska); all prices per long ton (2240 lb.) of dry weight, f.o.b. cars at stockpile designated by buyer.

"High Grade"—Base price, $48.00 per long dry ton for ore containing 40.0 per cent manganese with an increase of $1.00 per ton for each unit (22.4 lb.) in excess of 48.0 per cent; fractions prorated. "High Grade" ore containing not less than 48.0 per cent manganese but otherwise falling below specifications but within the limits set forth will be accepted subject to certain penalties.

"Low Grade A"—Base price, $35.20 per long dry ton for ore containing 44.0 per cent manganese with an increase of $0.80 per ton for each unit (22.4 lb.) in excess of 44.0 per cent; fractions prorated.

"Low Grade B"—Base price $26.00 per long dry ton for ore containing 40.0 per cent manganese with an increase of $0.65 per ton for each unit (22.4 lb.) in excess of 40.0; fractions prorated. Ore containing a minimum of 35.0 per cent manganese will be accepted under this schedule with a penalty of $1.30 per ton for each unit (22.4 lb.) less than 40.0 per cent; fractions prorated.

Ore Firms to Absorb

• • • **The iron ore** industry apparently will accept the OPA price ceiling without any major protest, despite some minor disruptions in normal pricing policies. However, the intricacies of attempting to delineate the actual costs that go into certain types of prepared ores, frequently representing a mixture of material from different mines with different cost factors, appear too involved to invite the industry to attempt to explain and clarify these complications to the OPA for the sake of securing minor adjustments. As a result, some companies will have to absorb some increased costs in shipping, labor and maintenance, although the larger volume of shipments in prospect may offset a portion of the increased costs. Thus, profit margins per ton in some cases will be reduced, before taxes, but the industry feels that this will be cheaper and less troublesome than to engage in a detailed controversy over prices with OPA officials.

Relaying Rail Price Boost

Washington

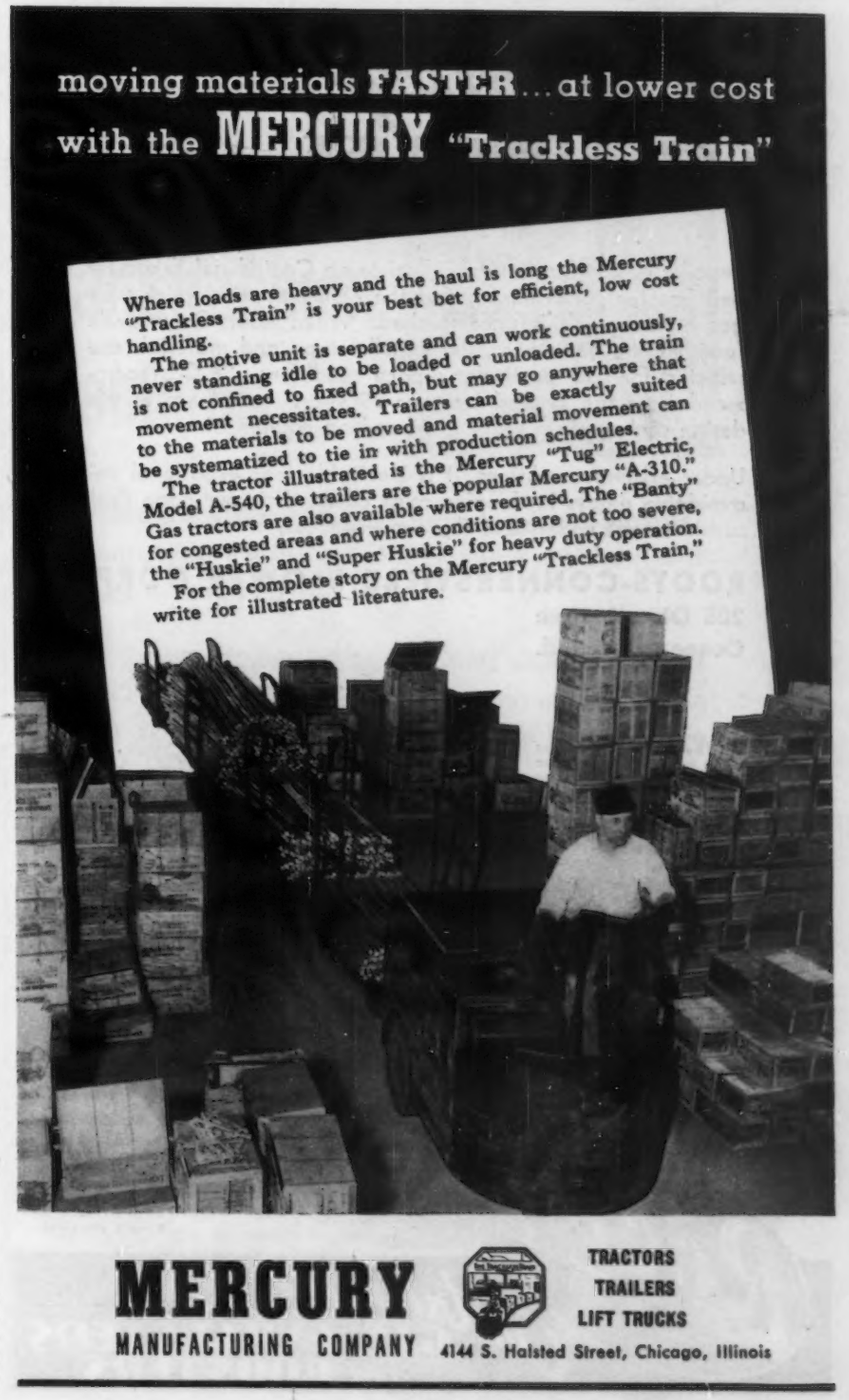
• • • **Maximum prices** on relaying rail sold in carload lots from a recognized relaying rail warehouse were increased by OPA by an amendment to price Schedule No. 46 for relaying rail, effective May 11, issued on Friday. On rail which weighed 45 lb. or more per yard, but less than 60 lb. per yard, when new, the maximum price has been increased to $35.84 per gross ton from $32.00 per gross ton. Rail which weighed between 35 and 45 lb. per yard when new, has had its price raised from $32 per gross ton to $39.20.

Upward revisions were decided on after it was found that previous maximum prices on some of the lighter weight of rails were too low. The maximum prices for all weights of relaying rail weighing more than 35 lb. when new, and sold out of a recognized relaying rail warehouse in less-than-carload lots remain unchanged.

Other changes embodied in the new amendment included the following:

1. **The section** (Section 1306.260) of Price Schedule No. 46 which allowed payment of a commission of $1 per gross ton to the agent of the purchaser for locating rail has been revoked, but provision for exceptions in special cases has been made.

2. **All persons** who purchase 100 gross tons or more of relaying rail in any calendar month hereafter must file reports with the OPA covering such purchases. Previously,


moving materials FASTER... at lower cost
with the MERCURY "Trackless Train"
Where loads are heavy and the haul is long the Mercury "Trackless Train" is your best bet for efficient, low cost handling.
The motive unit is separate and can work continuously, never standing idle to be loaded or unloaded. The train is not confined to fixed path, but may go anywhere that movement necessitates. Trailers can be exactly suited to the materials to be moved and material movement can be systematized to tie in with production schedules.
The tractor illustrated is the Mercury "Tug" Electric, Model A-540, the trailers are the popular Mercury "A-310." Gas tractors are also available where required. The "Banty" for congested areas and where conditions are not too severe, the "Huskie" and "Super Huskie" for heavy duty operation.
For the complete story on the Mercury "Trackless Train," write for illustrated literature.
MERCURY
MANUFACTURING COMPANY
TRACTORS
TRAILERS
LIFT TRUCKS
4144 S. Halsted Street, Chicago, Illinois

only purchasers of individual lots of 100 gross tons or more were required to file reports.

3. **The definition** of "person" as used in the schedule has been revised to include the Federal, State and local governments which were not specifically covered in the definition heretofore. The definition of "person" now conforms with the standard OPA definition of that term.

4. **Relaying rail** has been newly "defined" so that it will include rail used for purposes other than relaying but for which new rail had been customarily used prior to the wartime shortage of new rail.

5. **OPA reporting** requirements for all sales of relaying rail were modified slightly. Relaying warehouses now are required to file monthly reports covering all their sales in any calendar month rather than individual reports covering each sale, and they also are required now to file monthly reports if no sales took place during the calendar month for which the report is to be made.

Warning on Tubing Prices

• • • **Jobbers and** warehousemen of iron and steel products have been warned by OPA not to use list prices for cold finished mechanical tubing in computing their prices for hot rolled mechanical tubing.

According to an announcement issued by OPA last Friday, prices of hot rolled mechanical tubing must be calculated in the same manner as is provided for cold drawn mechanical tubing, with the exception that list prices for hot rolled tubing must be used.

Canada to Build Destroyers

Ottawa

• • • **Navy Minister** Macdonald told the House of Commons that keels for new destroyers will be laid in Canadian shipyards in a short time, and that Canada's navy would contain approximately 500 units and personnel of 44,000 officers and men by March 31, 1943. The Minister said that no construction of craft heavier than destroyers is now contemplated. He said that work on the destroyers was delayed when the United States entered the war and certain steel became unobtainable.

NEW FIRE PUMP: This is the first of the new 4-gal. pump tank extinguishers which will be distributed by the OCD to cities in strategic areas to fight fires caused by enemy action. The tank is made of non-essential materials, such as porcelain coated steel, plastics, reclaimed rubber, and cast lead. More than 2,000,000 will be distributed.

Acme Photo

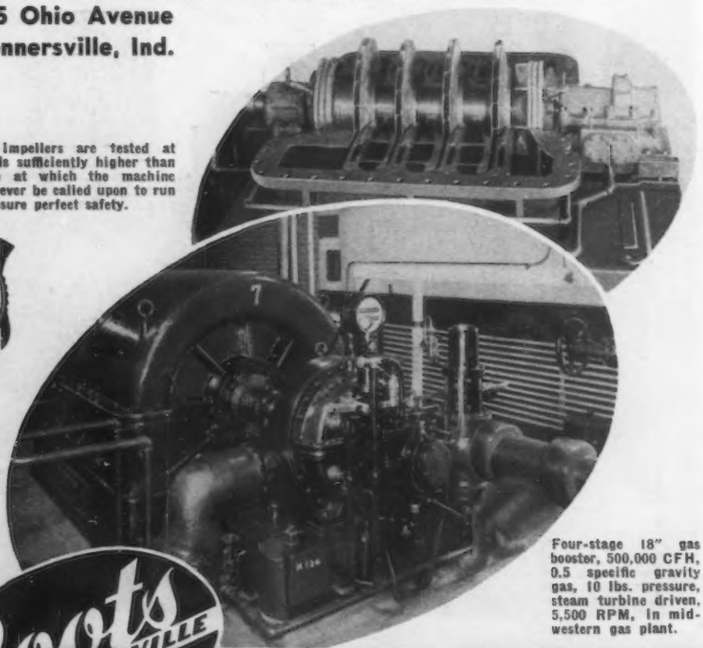
Assuring LONG LIFE and EFFECTIVE RESULTS

Impeller design has a vital influence on Centrifugal Exhauster and Booster performance, and the efficiency with which your gas handling job is accomplished. When Roots-Connersville furnishes the equipment, the impeller type and materials are selected for your particular service conditions. "R-C" recommendations are backed by over 85 years' experience in the design and application of gas handling equipment.

Under existing conditions, it is inevitable that occasional unavoidable delays in shipping must occur. It is our hope that customers will understand the circumstances.

ROOTS-CONNERSVILLE BLOWER CORP.
205 Ohio Avenue
Connersville, Ind.

All impellers are tested at speeds sufficiently higher than those at which the machine will ever be called upon to run to insure perfect safety.



Four-stage 18" gas booster, 500,000 CFH, 0.5 specific gravity gas, 10 lbs. pressure, steam turbine driven, 5,500 RPM, in midwestern gas plant.

All Out for Victory

Roots Connersville Since 1854

Centrifugal GAS EXHAUSTERS and BOOSTERS

Iron and Steel Alloys Placed Under Unified Allocation by WPB

Washington

• • • **With careful** definitions of what constitutes alloy iron and alloy steel, WPB on May 11 issued Amendment No. 3 to Supplementary Order M-21-a, placing all such products under a unified allocation system. The control of alloying metals entering into iron and steel melts will be subject after June 1 to monthly melting schedules to be issued by the Director of Industry Operations. On and after July 15, no producer required to file melting schedules shall deliver alloy metal containing chromium, cobalt, molybdenum, nickel, tungsten, or vanadium except on an order for which the melting has been specifically authorized by WPB.

Each producer shall file monthly with the WPB, on Forms PD-391, PD-391-a, and PD-440, his melting schedules under the order. Producers who melt less than 4000 lb. of chromium and less than 500 lb. of nickel in such month need not comply with this particular requirement.

The order as amended provides that no iron or steel may be melted or delivered except pursuant to a rating of A-3 or higher on orders for National Emergency (NE) steels, 4000 Series steels, and 9200 Series steels as described in "Contributions to the Metallurgy of Steel—No. 5," published in January by the American Iron & Steel Institute. Furthermore, no such metal may be melted or delivered except on an A-1-k or higher on orders for other alloy iron and alloy steel or on an order for which the melting has been specifically authorized by WPB.

Purchasers, after June 1, must accompany each order with a statement giving the end use to which the materials ordered will be put, the government contract, the date on which delivery is needed, and a statement that the delivery date is not earlier than necessary for the purchaser to meet his own delivery or production schedules.

↓ ↓

Heat Treating Furnaces

• • • **Preference rating** order P-74, which grants a rating of A-1-c to enable producers to obtain materials for the construction of heat treating furnaces, was extended until June 30. The order was due to expire on May 15. After June 30 all holders of P-74 ratings will be expected to qualify under the Production Requirements Plan.

↓ ↓

Alleged Priorities Violator

Washington

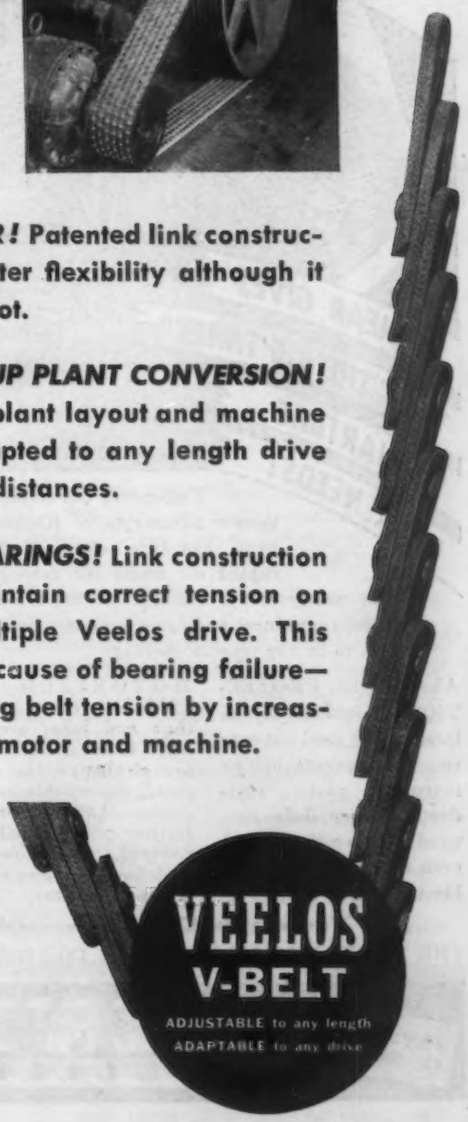
• • • **The Superior Metal Co.,** Chicao and Bethlehem, Pa., was prohibited from accepting deliveries of, processing, delivering or dealing in any manner in primary

How Veelos Solves 3 Wartime Power Transmission Problems!

1 ***VEELOS SAVES RUBBER!*** **Patented link construction gives Veelos greater flexibility although it uses less rubber per foot.**

2 ***VEELOS HELPS SPEED-UP PLANT CONVERSION!*** **Link Veelos simplifies plant layout and machine design . . . can be adapted to any length drive . . . imposes no fixed distances.**

3 ***VEELOS PROTECTS BEARINGS!*** **Link construction makes it easy to maintain correct tension on *each* strand of a multiple Veelos drive. This eliminates a common cause of bearing failure—the practice of adjusting belt tension by increasing distance between motor and machine.**



These are just a few of the Veelos advantages that offer industry real help in solving *today's* power transmission problems. Let a Veelos sales engineer—especially trained in power transmission work—tell you of many others just as important.

MANHEIM MANUFACTURING & BELTING CO., MANHEIM, PA.

nickel and other nickel products for a period of 60 days. WPB claims the company made misrepresentations when applying for priority assistance resulting in excessive inventories. The company was charged with certifying that it required 150 nickel anodes weighing 6000 lb. to complete contracts cited in its application. WPB asserted this was not true. It was alleged that the company obtained 14,000 lb. of nickel anodes on the basis of its statement that the material was needed for the completion of these contracts.

↓ ↓

Beryl Ore

• • • **Beryl ore** and beryllium, metallic beryllium and beryllium oxides and salts were added by WPB on May 4 to the list of materials whose importation are restricted by general imports order M-63. The order prohibits any person, except Government agencies or their authorized representatives, from making arrangements for importing materials listed in the order into the United States, except under contracts existing at the effective date of the order. Imports made under contract must not be sold, or transferred beyond a place of initial storage, except to a Government agency, under an existing contract, or with special authorization from the Director of Industry Operations.

Ore Movement on Lakes Sets New Record

• • • For the first time in the history of the ore fleet, operations began in March of this year, and the fleet, up to May 1, had hauled 8,585,740 tons of ore. Until the same time last year, the fleet had hauled only 6,954,793 tons. Thus, shipments are up nearly 24 per cent this year. April ore movement alone shows a 12 per cent rise over movement in April, 1941.

↓ ↓

Canning

• • • **Some general cans** used to package coffee, motor oil, and other products will continue to be available, according to an amendment to conservation Order M-81. The amendment permits the use of tinplate suitable only for food cans of sizes restricted by the original regulations, if the tinplate was on hand Feb. 11. This exception extends to can parts which were lithographed, cut, or otherwise prepared for assembly on or before Feb. 11 and is effective until further notice.

The amendment also extends indefinitely the terms of all general telegraphic exceptions to the order issued since Feb. 11. Thus, cans were manufactured in accordance with telegraphic permission relating to certain special products and "non-essential" cans, lithographed motor oil cans, cof-

Full-speed, day-and-night war production brings the long-known advantages of Kinnear Steel Rolling Doors into sharper focus than ever before. Their capacity for years of hard, uninterrupted use under the most gruelling conditions has been proved over nearly half a century. To meet today's demand for extra door convenience, ruggedness and space economy, install Kinnear Rolling Doors. Built any size, to fit any type of opening.

ALL STEEL PROTECTION! Kinnear's tough, interlocking steel slat construction prevents theft or intrusion, resists accidental damage, defies fire, wind and weather — and even closes light-tight for blackout safety!

MOTORIZED EFFICIENCY! Extra savings in time and labor are gained when Kinnear Rolling Doors are equipped for smooth, rapid, dependable motor operation. And this permits the further advantage of *remote control*, with convenient push-button stations at any number of points.

SAVINGS IN SPACE! All floor, wall and ceiling space around each opening remains clear and usable at all times when Kinnear Rolling Doors are installed. Another score for Kinnear's famous coiling upward action!

Write today for Kinnear's new, complete data book on doors!

THE KINNEAR MANUFACTURING CO., 1760-80 Fields Avenue, Columbus, Ohio

SAVING WAYS IN DOORWAYS
KINNEAR ROLLING DOORS

fee cans, and certain vegetable cans may now be used by packers.

↓ ↓

Rubber Tires

• • • **WPB assumed** rigid control over the production and distribution of all types of rubber tired construction equipment. Conservation of rubber is the purpose of the order. Specific authorization of the WPB is required for the future sale, lease, trade, loan, delivery, shipment or transfer of any new equipment, except for orders placed before the effective date of Order L-82-a, which carry preference ratings higher than A-2, and were placed before June 1. In order L-82, issued concurrently, WPB recognized that steel wheels and other substitutes were impractical for power cranes and shovels, and permitted the continued use of rubber tires. Restrictions on production and distribution are similar to those imposed by order L-82-a. Applications for release of all types of equipment should be made on Form PD-448.

↓ ↓

Steel Report Forms

• • • **According to** C. E. Adams, Chief of WPB Iron and Steel Branch, form PD-138 need not be filed for May and form PD-139 need not be filed for May and June. These forms are the new ones under the recent amendment to order M-21 restricting steel shipments by producers to consumers with ratings of A-10 or better. PD-138 is a monthly shipment schedule and PD-139 is a record of unfilled orders.

↓ ↓

Copper Scrap

• • • **Supplementary order** M-9-b, which controls copper scrap, was amended by WPB to include "ingots." Ingots are defined in the order as shapes for remelting which have been cast primarily from copper base alloy or scrap. The only other change in the order relates to foundries. Form PD-459 is provided for monthly reports from foundries which melt scrap or ingots, and is due before the 10th of each month.

↓ ↓

Aircraft Materials

• • • **Suppliers of material** used in the production of aircraft were allowed by WPB to apply A-1-a ratings for operating supplies necessary in processing aircraft parts furnished on ratings assigned by the order, by an amendment to order P-109. The cost of such operating supplies, however, must not exceed 10 per cent of the cost of the material from which the product is made. P-109, as amended March 11, provided that suppliers operating under exten-

LITERALLY millions of barrels for small arms, machine guns, anti-aircraft and naval guns are being machined today faster and truer than ever before — because of Houghton's cutting bases and ready-to-use oils.

Everyone in the small-arms industry knows how vital it is to use the best oil obtainable to withstand pressures and feeds, and assure a perfect barrel. These Houghton oils, developed for leading gun makers long before the war came to America, possess great film strength and high heat absorption qualities.

You'll find them described, along with other premier machining oils, in the booklet "Houghton Products for the Metal Industries." Write for your copy.

PRODUCTS FOR WAR MANUFACTURING

Carburizers
Quenching Oils
Drawing Compounds
Rust Preventives
Specialized Lubricants
Heat Treating Salts
Metal Cleaners
Pickling Inhibitors
Core Oils
Hydraulic Oils

E. F. HOUGHTON & CO.
Chicago • PHILADELPHIA • Detroit

The HOUGHTON LINE of straight cutting oils and bases

sions of ratings could only re-extend the rating to deliveries of material to be delivered to the primary producer, or to be physically incorporated into material to be delivered. It did not cover operating supplies necessary to processing such material. The amendment issued May 8 allows the rating to be extended, within certain limits, for necessary supplies such as lubricants, catalysts, abrasives, and small perishable tools.

Auto Parts

• • • **To permit** manufacturers of automotive replacement parts whose production is prohibited by supplementary order L-4-c to bring their production to an orderly close, WPB postponed the date on which the prohibition takes effect from May 1 to May 15. The order as issued would have brought production of all non-functional automotive replacement parts to an end immediately. The postponement is contained in amendment No. 1.

Incendiary Bombs

• • • **Because their** manufacture calls for the use of scarce materials, including magnesium and metal containers, the production and distribution of incendiary bombs for use as "demonstrators" by civilian groups is prohibited immediately by order L-115. Only permitted exceptions are to fill orders authorized in writing by the Army or Navy. All persons who have manufactured incendiary bombs or similar devices, for demonstration purposes, except for, or under the authorization of, the Army or Navy, since Sept. 1, 1941, must immediately report quantities and current inventories to the WPB on form PD-449. In addition to stopping production of incendiary bombs, the order prohibits all persons from selling, purchasing, delivering or accepting them.

Toy Raw Materials

• • • **WPB issued** an interpretation to the toy limitation order, L-81, to clarify the meaning of the term "raw material form." Critical material, the use of which is restricted in the order, is considered to be in raw material form when it has not been fabricated or processed for use in toys or games or parts, but is in such form that it can be fabricated or processed for use in any other product.

Construction Suppliers

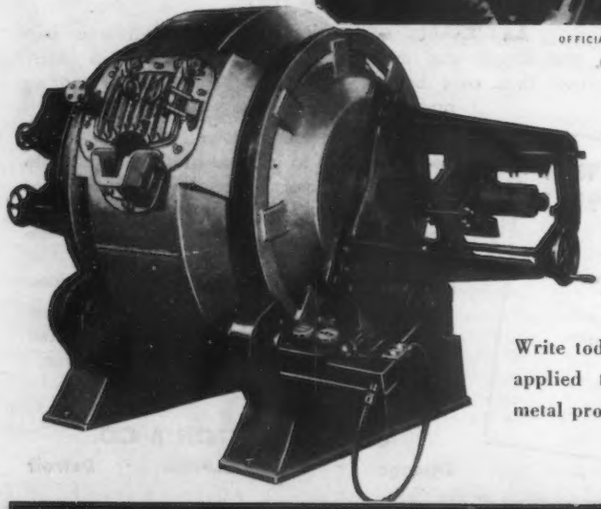
• • • **Material suppliers** to aluminum and magnesium plants under construction were advised that deliveries should be made on schedule even though subsequent orders assigned under order P-19-i carry higher ratings by interpretation No. 1 of the order. The order provided that after any A-1-b rating has been applied to any delivery, the delivery shall not be deferred or postponed by the application of any other rating assigned by any order or certificate except by specific direction of the WPB. The provision does not require or per-

DETROIT ELECTRIC FURNACES HELP SPEED THE PROGRAM OF AMERICA'S ARMS AT SEA!

In brass and iron foundries — jobbing, production and naval—Detroit Furnaces are filling a vital need in the manufacture of all types of commercial castings.

Detroit Furnaces offer a combination of melting speed, flexibility, efficiency and great versatility. Easy to use, they result in higher percentage of good product of superior quality with lower metal losses, less labor, less plant space and *the frequent use of salvage materials.* Write today for further data applied to your particular metal problems.

OFFICIAL U. S. NAVY PHOTOGRAPH



DETROIT ELECTRIC FURNACE DIVISION
KUHLMAN ELECTRIC COMPANY • BAY CITY MICHIGAN

mit the supplier to make deliveries on an order to which a rating has been assigned under P-19-i in preference to deliveries on earlier accepted orders bearing equal or higher ratings.

Aluminum Inventories

• • • **Because the** distribution of aluminum through warehouses is already strictly controlled under supplementary order M-1-f, WPB removed wholesalers' and distributers' stocks of supplies made of aluminum from the restrictions of the suppliers inventory limitation order L-63. The exemption permits suppliers to omit their stocks of aluminum and aluminum products in calculating their total permissible inventories prescribed by L-63.

Zinc Sulphide Pigments

• • • **A monthly** producers' pool in zinc sulphide pigments, of which lithopone is the principal product, was established May 6 by the WPB. The order, M-128, provides that there shall be set up by the 15th of each month a percentage of all classes of lithopone manufactured, to be set aside for the following month. Mandatory orders shall be filled from this pool, after which other production may be sold without restriction. Exports of lithopone other than lend-lease cannot be made except upon application to the WPB on form PD-464.

Toll Agreements

• • • **Manufacturers cannot** escape responsibility for scheduling deliveries in accordance with preference ratings by leasing plants or producing under toll agreements, it was explained by an official interpretation of priorities regulation No. 1. It has been a practice to lease all or part of a plant to a large customer for a few days a month while the plant continued to operate with regular personnel producing regular products. In other cases, manufacturers have processed materials furnished them by their customers on a fee or toll basis.

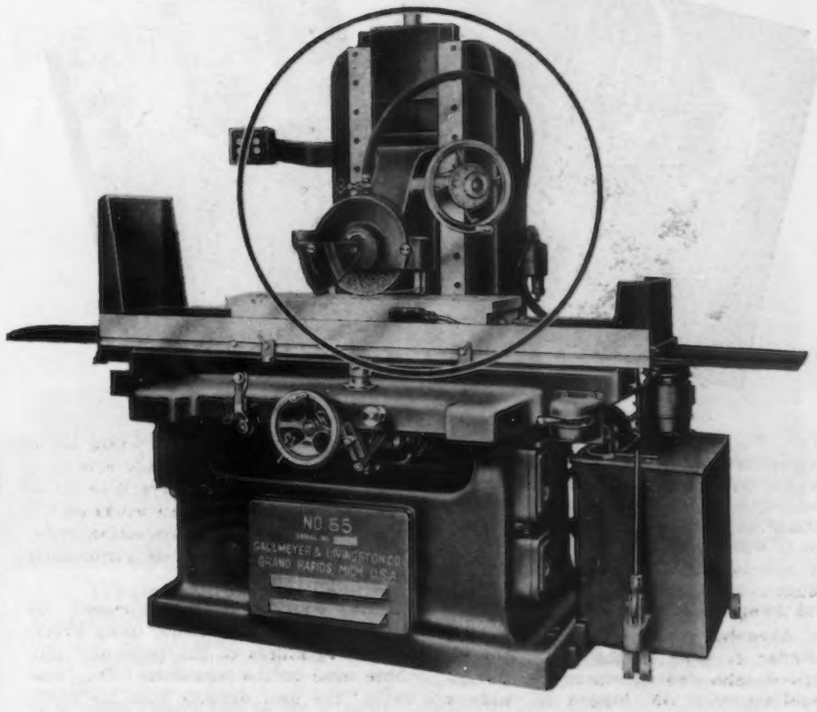
The interpretation points out that in neither of these cases is the manufacturer permitted to interrupt or delay his production schedules of orders bearing preference ratings, but must fill them in accordance with the ratings and delivery dates.

Plumbing Fixture Finishes

• • • **Amendment No. 1** to the WPB plumbing and heating simplification order, L-42, permits the use of lead and zinc as a preserving finish on plumbing fixtures and trim. The amendment removes all restrictions on the use of materials in fitting and trim made for chemical plants, hospitals, research laboratories, vessels other than pleasure craft, and airplanes, where use of non-critical materials is impracticable. Schedule V to the order prohibited the use of

GRAND RAPIDS

Precision Grinders



THIS hydraulic feed surface grinder combines rigidity with extreme accuracy. Patented vernier control graduated in .0001". Split tenths even on production job. Table Speed to 125ft/min. Table movement 13½x38". Table Size 12x36".

Catalog GL-100 on request.

GALLMEYER & LIVINGSTON CO.
200 STRAIGHT AVE., S.W.
GRAND RAPIDS MICHIGAN

metallic coatings for finishing purposes. The amendment revises the restriction to bar the use of chromium, nickel, cadmium, copper, and copper-base alloy. This action was taken after it was advised that at present there are sufficient quantities of lead and zinc to supply the amount needed for finishing purposes.

WPB also announced that Schedule VII of L-42, covering hot water heaters and piping systems, had been amended to permit exceptions to the schedule in meritorious cases.

Iron and Steel Products

• • • **On an unclassified** form mailed by WPB on May 5 to iron and steel producers, data concerning the output of the various producers will be accumulated. The form requests producers to check the types of iron and steel products manufactured, according to whether such products are carbon, stainless, or alloy steel. Listed on the form are 58 different steel products, and the form must be returned to the Allocations and Priorities Section, Iron and Steel Branch, War Production Board, Washington, D. C., as soon as possible.

High Temperature Refractories

• • • **Aluminum silicate** minerals, Indian cyanite, andalusite, and sillimanite used as a refractory in furnaces where extremely high temperatures are necessary may not be delivered, consumed, or processed without authorization from the WPB. Consumption is restricted to necessary uses. The order, M-143, requires suppliers and consumers using the minerals in the manufacture of refractories to file with WPB before the 20th of each month a report on form PD-466. The order is effective immediately and affects May deliveries.

Total of Priority Orders

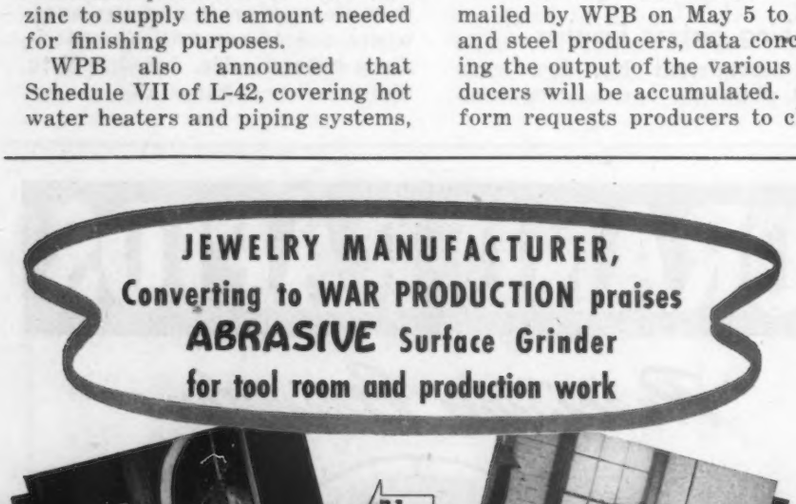
• • • **In the War** Statistical Progress Report, issued by the OEM on May 4, it is stated that to date there have been issued: 112 "M" orders, covering industry-wide controls over materials; 72 "P" orders, giving limited blanket ratings for materials entering into production of key war objects; 4 "E" orders, giving production preference to equipment especially needed for war; 87 "L" orders setting limits on production of materials or items; 34 suspension orders issued to violators of regulations and orders; and 9 priority regulations, issued on functioning of priority orders and certificates.

Transportation Rulings

Shipping Priorities On S. A. Trade

• • • **A system of** shipping priorities designed to expedite production in other American republics as well as provide shipping facilities, was announced by the Board of Economic Warfare, State De-

JEWELRY MANUFACTURER,
Converting to WAR PRODUCTION praises
ABRASIVE Surface Grinder
for tool room and production work



When The Armbrust Chain Co., jewelry manufacturers of Providence, R. I., many months ago foresaw the dilemma facing their industry they wisely decided to take steps at once to convert their facilities to war work. They are now working as sub-contractors, finishing parts of gauges, snap gauges, lapping plates, and doing die work of all kinds.

An **Abrasive No. 1½ Hand Operated Grinder** is used in the tool room for various jobs—the operators like its unusual capacity (15" long x 10" wide x 12" high); its accuracy; and smooth grinding finish.

The **No. 3B Automatic Grinder** is used on production work. When photographed it was grinding one of a large lot of cast iron bases. The operator sets up a piece on the 3B and leaves it to do its job automatically while he works on adjacent machines. For production work, the fast automatic feed is particularly desirable.

Similar satisfaction is expressed by ABRASIVE Surface Grinder users everywhere regardless of the particular machine used or the jobs done. The "precision" the user expects from his Abrasive Grinder is built right into it! Write for bulletins describing the machines illustrated or the No. 34 vertical spindle grinder.

ABRASIVE MACHINE TOOL CO., EAST PROVIDENCE, RHODE ISLAND, U. S. A.

WRITE OR PHONE NEAREST DEALER

HENRY PRENTISS & CO.
New York ... Murray Hill 9-6492
Boston ... Hancock 6750
Worcester ... 3-2173
Springfield ... 4-6393
Hartford ... 32-6489
Buffalo ... Delaware 3420
Rochester ... Genesee 764
Syracuse ... 2-2972

SWIND MACHINERY CO.
Philadelphia ... Rittenhouse 4340
Baltimore ... Tuxedo 0104
York ... 5820

THE MOTCH & MERRYWEATHER MACHINERY CO.
Cleveland ... Main 1000
Pittsburgh ... Atlantic 3985
Cincinnati ... Main 2666
Akron ... University 3075

CHENEY & MORETON
Detroit ... 2-5050

MARSHALL & HUSCHART MACHINERY CO.
Chicago ... Randolph 8860
Milwaukee ... Edgewood 5576
Rock Island ... 348
South Bend ... 4-9555

MARSHALL & HUSCHART MACHINERY CO. OF IND.
Indianapolis ... Riley 6335
Muncy ... 4837

BLACKMAN & NUETZEL MACH. CO., INC.
St. Louis ... Ne. 0765

TIDEWATER SUPPLY CO., INC.
Norfolk ... 27311
Asheville ... 376
Columbia ... 8169

W. S. MURIAN CO.
Knoxville ... Knoxville 3-4331

HENES-MORGAN MACHINERY CO. LTD.
Los Angeles ... Jefferson 7185

JENISON MACHINERY CO.
San Francisco ... Valencia 1710

partment, and the Coordinator of Inter-American Affairs. Beginning May 7, licenses covering goods moving by water to other American republics will bear shipping priority ratings, which will become effective with steamship lines in the near future. Steamship operators will be directed by the War Shipping Administration to book cargo in accordance with these ratings, as fixed by the Office of Exports.

Ratings will be assigned on the basis of the "use" of the goods, highest ratings being given materials contributing directly to the war program, hemispheric military defense, and to the maintenance of industrial, economic, and civilian life of the country of destination. Lower ratings will be assigned materials which, while important to industrial and civilian life, are not vital to the economic stability of the country of destination.

The ratings are defined as follows:

Rating A—Assigned to licenses authorizing exportation of articles and materials contributing directly to the war program or to hemispheric defense.

Rating B—Assigned to licenses for articles and materials essential to maintenance of industrial, economic, and civilian life of the country of destination.

Rating C—Assigned to licenses for commodities deemed important to the industrial and civilian life of the country of destination, but for which there is no immediate urgency and the lack of which would not cause economic dislocation.

Rating D—Assigned to licenses for nonessential articles and commodities which, while desirable, appear unnecessary in war time and for which there are substitutes or without which the economic or civilian life of the country of destination would not be seriously harmed.

Rating AA—A special rating held in reserve to be applied in cases considered of utmost importance and urgency.

↓ ↓

L.c.l. Loadings

• • • **A saving of** 31 per cent in closed freight cars loaded with l.c.l. merchandise was disclosed two days after ODT's general order No. 1 became effective. The order, setting a 6-ton weight minimum on merchandise loading and prohibiting use of closed cars in intraterminal movement, took effect May 1.

↓ ↓

Great Lakes Shipping

• • • **To assure cargo** space for the preferential movement of iron ore, ODT banned all grain movement over the Great Lakes, except by special permit. The prospect of an unprecedented movement of ore tonnage, nearly 90,000,000 tons for the season, prompted the issuance of the order, and a number of lake carriers had already taken steps to adjust their movements to conform with it. General order No. 8, effective May 15, brings under control some 340 ships with a gross carrying capacity of nearly 3,000,000 tons suited to ore cargo; and a number of mixed carriers used in scrap, coal, and grain movement.

↓ ↓

Tank Cars

• • • **The effective** date of the tank car control order, ODT No. 7, has

Cincinnati

HERRINGBONE GEARED

HYPRO

OPENSIDE

PLANERS

When buying a modern planer check these features:

MAGNETIC DIAL FEEDS (Patented) Individual for rail heads and side heads. Feeds selectable by 64ths from 1/64" to 1" with a twist of the wrist. Feeds may be changed at any position or direction of table travel. Heads may be fed at either end of table stroke.

STEEL TEE SLOT INSERTS (Patented) Table Tee Slots are fitted with steel inserts so that lower edges will not be damaged by bolt heads. This construction prevents pulling out of tee slots insuring perfect condition of table throughout life of machine.

DOUBLE BRONZE NUTS Used on all down feed and cross feed screws in all saddles and slides. This construction provides double life for all screw movements as all thrust and wear is taken by two nuts instead of one.

EXTENDED SADDLE AND HARP To provide extra support for the slides along with an additional long-leverage bolt circle producing maximum rigidity between saddle and harp.

Examine the Hypro Openside Planer critically. Full particulars in our new Bulletin No. 110 sent free on written request.

PLANERS · PLANER MILLERS · BORING MILLS

THE CINCINNATI PLANER CO.

CINCINNATI, OHIO

been postponed from May 15 to June 1, to give shippers more time to file applications for permission to move cars affected.

The order, which sets up a Section of Tank Car Service, prohibits the movement of any loaded tank car without special or general permission of the Office of Defense Transportation except for cars covered by blanket exemptions, according to the announcement.

Referee Advocated For Hardship Cases

• • • **Complications** arising out of conflicting orders issued by various WPB branches frequently interfering with vital production or expansion would be minimized greatly if a "referee" or arbitration board were given power in Washington to make exceptions to various rulings, according to a leading steel authority, who pointed out that in two cases where construction of defense plants had been designed for the use of structural steel, which later was prohibited, redesigning of the structures was necessary. In one of the cases where heavy overhead cranes are to be installed, inability to use structural steel will impose handicaps. In another case, a sudden order freezing warehouse stocks delayed the pouring of concrete at a new blast furnace for a week, when the project needed only 600 lb. of reinforcing bars which might have been very easily obtainable from nearby warehouses. In a third instance, after some four months' work had been done to recondition a rolling mill to permit plate production, a sudden change in Federal plans necessitated the abandonment and loss of the work done, so that the job could be started all over at another site upon a different abandoned unit. Such situations might have been avoided if there were a central authority to whom the cases might have been appealed.

BEAT THE
Production Promise
Install R-S Furnaces
R-S Heat-Treating Furnaces have been developed for victory production needs and high peaks of efficiency in automatic operation.
In recent months, new methods of automatic control have been applied to mechanical apparatus and material handling equipment. Reception has been enthusiastic. Such favorable results have been obtained that numerous repeat orders have resulted.
You can beat that production promise with an R-S Furnace. Because of wartime restrictions, wire or write for detailed information and prompt delivery date.
R-S PRODUCTS CORPORATION
4524 Germantown Ave.
Philadelphia, Pa.
R-S
QUALITY PRODUCTS SINCE 1908
R-S Furnaces of Distinction

J. & L. Granted Extension in Priority Complaint Case

Pittsburgh

• • • **Jones & Laughlin Steel Corp.** has been granted an extension of time to June 11 to file an answer to the government's complaint charging priority violation. The court, in granting the postponement, stipulated that it would not prejudice the right of the government to file an application for preliminary injunction before June 11.

The government refiled its suit against Carnegie-Illinois in a New Jersey court since it has been agreed the Wilmington, Del., district Federal court lacked jurisdiction. For details of the company reply, see page 124.

The government's complaints on these cases have been denied by both companies which for weeks past have been producing approximately their entire output in priority business, the greater percentage of which involved rating of A-2 or better. Since the citations, both companies have been commended by various branches of the government for their efficient production of war materials.

This Week's Priorities and Prices

Iron and steel scrap price violations by six steel firms and a broker resulted in temporary restraining orders, issued May 1. (OPA-PM 3135)

Temporary price regulations 3, 4, 5, 6, and 9 will be superseded by provisions of general maximum price regulation. (OPA-PM 3154). Supplementary order No. 4 revokes seven temporary maximum price regulations. (OPA-PM 3115)

Price executive of the Consumers Durable Goods section of OPA appointed: Alfred Auerbach. (OPA-PM 3163)

Machine tools put under allocation by order E-1-b. (WPB-1024)

Metal in pencils except limited quantities of iron and steel, banned by order L-113. (WPB-1031)

Southern Scrap Material Co., Inc., New Orleans, penalized by order S-40 for violations of copper conservation program. (WPB-1038)

Used refrigerator ceilings established by maximum price regulation 139, effective May 18. (OPA-PM 3187)

Industrial diamonds subjected to general maximum price regulations. (OPA-PM 3193)

Cottonseed oil ceilings set by amendment 1 to revised price schedule 53, effective May 11. (OPA-PM 3197)

400 metal products banned by conservation order M-126, effective May 5. (WPB-1012)

Material suppliers for construction of aluminum and magnesium plants advised by interpretation No. 1 of order P-19-i, that deliveries should be made on schedule even though subsequent orders assigned under P-19-i carry higher preference ratings. (WPB-1069)

Copper use in motor vehicles restricted by order L-106 in all by essential operating parts. (WPB-T 274)

Distributers and wholesalers, by amendment 2 to order L-63, permitted to accept deliveries of limited quantities of specific items regardless of their total inventories. (WPB-T 278)

Zinc sulphide pigments monthly pool established by order M-128, effective May 6. (WPB-T 281)

Naphthalene distribution placed under rigid allocation control beginning June 1 by order M-105, effective May 6. (WPB-T282). Naphthenates and Naphthenic acid placed under strict use and allocation control by order M-142, effective May 5. (WPB-T 277)

Lead and zinc as a preserving finish on plumbing fixtures and trim permitted by amendment 1 to schedule V to order L-42, effective May 6. (WPB-T 283)

Indian kyanite, including andalusite and sillimanite, super-duty refractories, placed under complete allocation control by order M-143, effective May 6. (WPB-T 284)

Machines and parts not covered by other price schedules are placed under ceilings by comprehensive maximum price regulation 136, effective May 18. (OPA-PM 3149)

Effect of 6 per cent freight rate increase on prices of iron and steel products clarified under provisions of price schedules 6 and 49. (OPA-PM 3182)

Safety equipment materials, aluminum, copper, plastics, etc., under strict regulation by order L-114, effective May 5. (WPB-1053)

Replacement parts production, by order L-4-c effective May 5, cut for automobiles and light trucks for civilian use. (WPB-1054)

Fuel oil preference ratings were completely cancelled by Order M-114, effective May 5. (WPB-1055)

Reports required in connection with construction project rating orders of the P-19 series discontinued by amendment 2, to priorities regulation No. 8, effective May 5. (WPB-T 270)

Aluminum stocks in hands of wholesalers and distributers are removed from restrictions of the supplier's inventory limitation order L-63 by exemption 4, effective May 4. (WPB-T 273)

Gray iron casting maximum price regulation expected before May 11. (PM-3173)

Private imports further restricted by amendment 5 to order M-63, adding a number of materials to be included in order. (WPB-1050)

Kapok as insulation for industrial refrigeration and as stuffing for civilian maritime equipment banned by amendment 2 to order M-83, issued April 30. (WPB-T265)

Iron and steel warehouse order, M-21-b, revised by amendment N. 4 to conform with order M-21 as regards the prohibition against deliveries by producers on ratings lower than A-10 except in certain specified cases. (WPB-T269)

• • •

For copies of above announcements address Division of Information, WPB (or OPA), Washington, giving announcement number as shown in parentheses after each paragraph. (For example, **WPB-600** *means announcement* **600** *issued by the War Production Board.)*

Revisions for the Iron Age Priorities Guide

• • • The following data, together with all intermediate weekly revisions in THE IRON AGE, should be added to THE IRON AGE Priorities Guide published with the issue of March 26 to bring the Guide up to date:

Under "P Orders," page 5, add:

P-109...Amendment No. 1 to order as amended March 11 allows suppliers of aircraft materials to apply A-1-a rating for necessary operating supplies. (5-8-42)

Under "M Orders," page 9, add:

M-1-d...Amendment No. 1 requires specific data from the maker concerning aluminum scrap and redefines plant scrap. (5-2-42)

M-9-a...Amendment restricts shipments of brass mill, wire mill, and foundry copper products to ratings of A-1-k or better. (5-7-42)

M-9-b...Supplementary order controlling copper scrap amended to include "ingots," and include foundries under the order. Related form: PD-459. (5-9-42)

M-9-c...Prohibits use of copper and alloys in 100 civilian products; curtails other uses after June 15; and orders other restrictions. Related form: PD-167. (5-7-42)

M-21-b...Forbids iron and steel warehouse deliveries on ratings lower than A-10, to conform with recently revised producer order, M-21. Related forms: PD-83-a, PD-83-Revised, PD-83-c-Revised, PD-83-g, and PD-83-f-Revised.

M-63...Amendment No. 5 to the general imports order places beryl and berryllium ore, metallic berryllium and other products under the scope of the order. (5-4-42)

M-81...Amendment permits utilization of tinplate sheets on hand Feb. 11 for certain food can sizes. (4-30-42)

M-105...Places allocation control, beginning June 1, over distribution of naphthalene. Related forms: PD-435 and PD-436.

M-126...General iron and steel conservation order, which includes aluminum, copper and alloys, carbon and alloy steel, iron, nickel and alloys, ferroalloys, tin, zinc, lead, rubber, and other materials. Related form: PD-437. (5-5-42)

M-128...Established a monthly producers' pool in zinc sulphide pigments. Related form, PD-464. (5-6-42)

M-143...Places under allocation control Indian Kyanite, including andalusite and sillimanite, super-duty refractories, effective May 6. Related form: PD-466, to be filed by 20th of each month.

Under "L Orders," page 12, add:

L-4-c...Amendment 1 postpones effective date of order from May 1 to May 15, 1942, relating to auto replacement parts. (5-8-42)

L-21-a...Amendment 1 permits manufacturers of automatic phonographs and other amusement machines who have on hand frozen stocks of materials to dispose of these inventories to fill orders bearing ratings higher than A-2. (5-2-42)

L-23-b...Freezes all stocks of domestic electrical ranges except on rating of A-9 or better or by specific WPB authorization and limits production to orders bearing A-1-k rating or higher. Appeals to be made on form PD-417. (5-2-42)

L-30...Amendment 2 excludes from restricted list coat hangers in which the only critical material is a steel wire hook, and removes restrictions on use of joining hardware in assembly of household articles. (5-9-42)

L-39...Amendment 2 freezes all 2½-in. brass fire-hose couplings in hands of distributors. Amendment 1 froze such couplings in manufacturers hands. (5-2-42)

L-42...Amendment 1 to schedule V permits use of lead and zinc as a preserving finish on plumbing fixtures and trim, and revises restrictions on other materials for such uses. (5-6-42)

Pig Iron Not Obtainable On Old Form PD 69

Washington

• • • **Revision of PD-69 means** that users of pig iron who applied for June allocations on the old form will have to re-file their requests on the new form. William Kerber of the WPB pig iron allocation unit says that the new forms were in the hands of producers in time. He indicated that the old forms would not be acceptable, and that producers who had filled them out in error would be asked to make out the revised form.

WPB Sub-Contract Trailer Starts Illinois-Iowa Tour

Rockford, Ill.

• • • **An Illinois-Iowa** war production caravan consisting of two trailers, has opened its tour here under the sponsorship of the WPB. Parts, drawings and specifications are exhibited to potential sub-contractors, and engineers from the Washington and Chicago WPB offices accompany the trailers. Only those who have qualified with their local Chambers of Commerce are admitted to the exhibitions.

Foundries Able to Obtain High Rated War Business

Cleveland

• • • **An analysis of** orders for merchant pig iron allocations for June indicates that many foundries, including gray iron foundries, have been successful in obtaining high-rated war orders, as may be reflected by the greater concentration of high ratings among current orders for pig iron. One outstanding example is the case of a foundry which a month ago was engaged entirely in B-rated business, and after aggressively soliciting various machine tool builders, engineering companies, and other concerns heavily engaged in war work, succeeded in receiving a tremendous amount of high-rated orders ranging from A-1-a down. Apparently, there is still much of this kind of business available for foundries, as may be reflected in reports of difficulties in castings deliveries to machine tool producers and manufacturers of heavy engineering equipment.

As a whole, orders for June allocations are below last month's total so that pig iron producers and the allocations board will have a simpler job in allotting next month's output. However, the trend toward higher ratings has become so pronounced that it is likely that A-10 orders may not be filled a few months hence.

The suspension of Carnegie-Illi-

PD-437 (4-28-42) ORIGINAL

WAR PRODUCTION BOARD
DIVISION OF INDUSTRY OPERATIONS

SERIAL No. 3040

APPEALS FORM

IRON AND STEEL CONSERVATION ORDER M-126

Appeals will not be considered unless this form is filled out carefully in accordance with instructions, and filed in the nearest W. P. B. Priorities Field Office.

This form must be used in filing all appeals arising under Order M-126. File this appeal form in triplicate with your nearest W. P. B. Priorities Field Office, who will forward the appeal to the War Production Board. Only appeals of *manufacturers* subject to the restrictions of M-126 will be considered. File a separate Form PD-437 for each product appealed under Order M-126, unless otherwise authorized by your nearest W. P. B. Priorities Field Office. If existing raw material inventory records are not maintained for the products being appealed give data in Section E, columns 3 and 4, on your total inventory for the department, division, or plant.

Product Appealed .....
Date of Appeal .....
Case No. .....

A. NAME OF FIRM ..... ADDRESS ..... (Street) (City) (State)

IF SUBSIDIARY ..... (Name of parent company) (Street) (City) (State)

DEPARTMENT, DIVISION OR PLANT ..... (Name) (Street) (City) (State)

1. Are you filing appeals under M-126 for this plant on other products at this time?

If so, specify Serial Nos. .....

2. Do you plan to file additional appeals under M-126 in the future? ..... (Yes or no)

B. HAS AN APPEAL FROM THIS ORDER FOR THIS PLANT BEEN MADE BEFORE? ..... (Yes or no) IF YES, GIVE SERIAL NOS.

.....

C. RELIEF REQUESTED:

1. Description of product under appeal .....

.....

2. What relief do you require (specific facts only, including time periods and number of units)?

3. How would granting this appeal further the war effort?

D. WAR CONTRACTS:

1. What products for the Army, Navy, and Maritime Commission are being manufactured by you? .....

.....

2. Value of prime war contracts and/or letters of intent on hand from Army, Navy, and Maritime Commission

$.....

3. Value of subcontracts and/or letters of intent under prime war contracts with the agencies listed in Item D-2

$.....

4. Value of subcontracts, under Items D-2 and D-3, that have been placed with others $.....

5. Net contracts for war products (2 and 3 less 4) $.....

16—98818-1

Appeals Form Under Metal

FORM PD-437: This is the form upon which appeals to the iron and steel be filed. Copies of the form are obtainable from WPB field offices, and appealing has his principal place of business. Order M-126 will be

E. CONSUMPTION, QUOTA AND INVENTORY DATA

ITEM	Used in manufacturing product being appealed in this application during the calendar year 1941 (1)	Quota allowed under Order M-126 for product appealed in this application (2)	Estimated inventory 45 days from governing date as defined in order (3)	Materials and parts in inventory (Item E-3) that can be used for war products (Item D-6) (4)	Additional material and parts to be purchased if appeal is granted (5)
RAW MATERIALS					
Aluminum.....pounds					
Copper and copper-base alloys.....pounds					
Steel, carbon.....pounds					
Steel, alloy.....pounds					
Iron.....pounds					
Nickel and nickel alloys pounds					
Ferro-alloys (specify type).....pounds					
Tin.....pounds					
Zinc.....pounds					
Lead.....pounds					
Rubber.....pounds					
Other.....dollars					
Fabricated parts dollars					
Semifabricated products dollars					

F. FACTORY SALES VALUE OF PRODUCTS PRODUCED AND EMPLOYMENT DATA
(Estimate future months for which relief is requested)

	1942									
	MONTHLY AVERAGE, JAN.-MAR., INCL.	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
1. Total production of all products:*										
(a) Factory sales value of products produced										
(b) Average number wage earners:**										
Skilled										
Semi-skilled										
Unskilled										
2. Production of product appealed, if appeal is granted:										
(a) Factory sales value of products produced										
(b) Average number wage earners:**										
Skilled										
Semi-skilled										
Unskilled										
3. Net production on war orders (Item D-5):*										
(a) Factory sales value of products produced										
(b) Average number wage earners:**										
Skilled										
Semi-skilled										
Unskilled										

G. IF YOU ANTICIPATE A DECREASE IN YOUR EMPLOYMENT, HAVE YOU NOTIFIED YOUR NEAREST U. S. EMPLOYMENT SERVICE OFFICE? .....
(Yes or No)

*NOTE.—Estimate for future months on the basis that no manufacturing of the products prohibited by Conservation Order M-126 is carried on 45 days after the governing date and that there is no assembly of such prohibited products 90 days after the governing date.

**NOTE.—WAGE EARNERS: *Exclude* office and clerical, executive, managerial, supervisory, technical and professional personnel, persons working at their homes or in other establishments on materials furnished by you, and those who are installing your product, or who are engaged in construction if such work involves additions to or major repairs of plant or equipment. *Include* all other skilled, semi-skilled and unskilled piece and time workers in production and other departments such as maintenance, shipping, warehousing, power plant, etc. Include all working foremen, and gang and straw bosses, but not those whose work is primarily supervisory.

Section 35 (A) of the United States Criminal Code, 18 U. S. C. A. 80, makes it a criminal offense to make a false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

The undersigned certifies that the above information is complete and correct to the best of his knowledge and belief.

.....
(Signed)

.....
(Title)

U. S. GOVERNMENT PRINTING OFFICE 16—28918-1

Conservation Order M-126

conservation order, M-126, prohibiting output of some 400 metal products, must appeals must be filed with the WPB office for the district in which the person administered from New York, with Edwin F. Addis, acting as administrator.

nois' No. 5 blast furnace at its Ohio Works for relining, in addition to reports of similar stoppages in other districts, indicates that pig iron production this month may fall below last month's total. Perhaps this may necessitate a carryover of some allocations into June, thereby requiring an adjustment in that month's allocations later on.

WPB Favors Plate Output By Stopping Sheet Rollings

Pittsburgh

• • • **The urgency of** plate requirements has caused WPB to eliminate all sheet rollings, except those involving extreme widths, from at least one strip mill, and additional action of this nature is anticipated. This, in effect, curtails all sheet production on this mill except the extreme widths and some tin plate coils.

Wider sheet sizes, which will have to be rolled on continuous mills because of the lack of facilities elsewhere, will probably include only allocated or A-1-a tonnages. A redistribution of the orders that cannot be handled on the wide strip mills is already under way in the one instance cited, and this type of business will certainly run into the "high priority situation" at every other unit where production is directed.

The plate supply situation, as has been pointed out by various government officials and denied by other sources, has become extremely difficult during the past two months. The lack of this important commodity has, it is claimed, held up ship production; and, if this is so, has probably held up production of machine tools, various plant construction programs, and has been below the desired quota for Lend-Lease.

Oregon Shipbuilding Corp. Gets 42-Ship Contract

Washington

• • • **The Oregon Shipbuilding** Corp., Portland, Ore., has been awarded a contract for the construction of 42 additional emergency cargo vessels, Liberty ships, the Maritime Commission has announced. This brings the total number of emergency cargo vessels contracted for with that yard to 173.

Adams Resigns From WPB Steel Position

Washington

• • • **The resignation** last Thursday of C. E. Adams as chief of the WPB Iron and Steel Branch was announced on Tuesday by William L. Batt, director of WPB's Materials Division. Mr. Adams has been succeeded by Reese Taylor.

Carnegie-Illinois Files Answer to Priority Charges

Pittsburgh

• • • **With a week** following the receipt of a complaint, Carnegie-Illinois Steel Corp. yesterday filed with the United States District Court of New Jersey an answer emphasizing the company's compliance with the priority system.

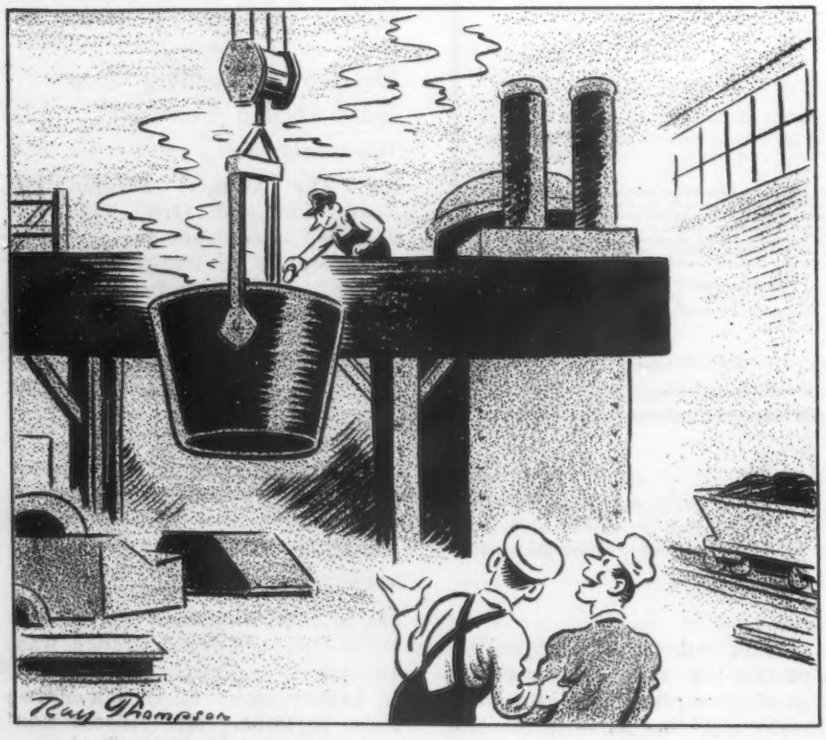
Striking out in a criticism of the entire priority technique since its inception, the reply contended "any failures in priorities administration were due not to our noncompliance, as the complaint alleges, but to defects in the system itself or in the method of administering it."

In a strongly worded statement, J. L. Perry, president of Carnegie-Illinois, said, "The Carnegie-Illinois Steel Corp. filed its answer in the government priorities suit within a week after receiving the complaint which was not filed in the United States District Court of New Jersey until May 5, although a press release was issued Sunday, April 19, charging Carnegie-Illinois with "repeated, deliberate violations" of priorities continued down to that date.

"The complaint excused its failure to allege a single, specific violation of priorities by Carnegie-Illinois by the claim that, on account of its widespread operations, a thorough investigation had been impossible.

"In a single investigation covering a period of at least 10 days in March, 1942, the WPB had 18 investigators, consisting of lawyers, economists and accountants at Corporation mills in the Pittsburgh district, examining Corporation records, interviewing its officers and employees and observing mill operations. Every opportunity and facility were afforded them to make a complete and thorough investigation and to ascertain the exact facts.

"In a sworn answer I have denied the charges in the complaint and have stated the facts with respect to the development and administration of the priorities system and our compliance with it and that any failures in its administration were due not to our noncompliance, as the complaint alleges, but to the defects in the system itself or in the method of administering it. We shall seek the earliest opportunity to prove the truth of our specific denials and affirmative allegations."



"There's Bennie again fixing his three minute egg for lunch."

Garst to Represent WPB Division in Alaska

Washington

• • • **Jonathan Garst** has been appointed to represent the WPB Materials Division in Alaska. Mr. Garst has been loaned to WPB for the tour of duty in Alaska by the Agricultural Marketing Administration. Mr. Garst's duties, William L. Batt, director of the WPB Materials Division, explained, will be to work with the Bureau of Mines and the Geological Survey in an extensive survey of Alaska for deposits of critical minerals. As new deposits are uncovered by the surveying agencies, Mr. Garst will assist in getting mines into production and their output on the way to shipping centers for transport to United States smelters. Mr. Garst will have full powers to act for him in Alaska, Mr. Batt said.

Furnace Breakout at Pittsburgh Kills Three

Pittsburgh

• • • **A break-through** in a steel company blast furnace here below the tapping hole early this week killed three workmen and injured several others. The blast furnace was taken out of operation for repairs. The accident was most unusual since the hot metal came up through the floor of the cast house because of the extreme pressure in the furnace and the fact that the breakout occurred below the tap hole and the floor. It was a Jones & Laughlin stack.

Chicago Plant Wins Navy E

Chicago

• • • **A Navy E award** for outstanding production was presented last week to the Automatic Transportation Co., a division of Yale & Towne Mfg. Co., in ceremonies at the company's local plant. W. Gibson Carey, Jr., president of Yale & Towne, in accepting the award, credited Automatic's general manager, Elmer W. Twyman, as being chiefly responsible for the plant's production accomplishments which earned the award.

PERSONALS

• **Walter Geist,** who entered the employ of the Allis-Chalmers Mfg. Co., Milwaukee, as an errand boy 33 years ago, was elected president of the company, replacing W. C. Buchanan who retired a few weeks ago due to ill health. Mr. Buchanan was formerly executive vice-president. He has been designated a "Modern Pioneer" by the National Association of Manufacturers and is a member of the association's policy committee.

• **Fred S. Doran** has been elected vice-president of Joseph T. Ryerson & Son, Inc., Chicago. Mr. Doran started with the firm in 1905. In 1920 he was appointed assistant sales manager, becoming manager of the Ryerson Cleveland Steel Service plant in 1927. Last October he was transferred to the general offices in Chicago to assume direction of purchases for all 10 Ryerson plants.

• **Joseph G. Schaefer** has been appointed vice-president in charge of operations of the Wyckoff Drawn Steel Co.'s plants at Ambridge and Chicago.

• **Andrew H. Phelps,** general manager of purchases and traffic, has been elected a vice-president of the Westinghouse Electric & Mfg. Co., East Pittsburgh. He joined Westinghouse in 1937, going there from the McGraw-Hill Publishing Co., where, for seven years, he served as sales manager and director of public relations. Three other Westinghouse executives who have been promoted to the rank of vice-president are **L. E. Osborne,** manager of the Westinghouse steam division, who joined the company in 1910 as a tool clerk; **Frank C. Reed,** who has been president of the Westinghouse Electric Elevator Co. since 1936, and **Walter C. Evans,** general manager of radio, X-ray and broadcasting division.

• **Jesse R. Harlan** has been appointed sales manager of the Crescent Truck Co., Lebanon, Pa. Mr. Harlan has been formerly connected with the Yale & Towne Mfg. Co., as advertising manager of the Yale-Stuebing Division and as head of sales promotion for its Philadelphia Division.

WALTER GEIST, president, Allis-Chalmers Mfg. Co., Milwaukee.

• **Samuel F. Baker** has been named president of the Barium Stainless Steel Corp., Canton, Ohio. Other officers recently elected are **Rudolph Eberstadt,** chairman of the board; **J. A. Sisto,** chairman of the executive and finance committee; **A. C. Corbett,** secretary and assistant treasurer; **W. W. Randall,** assistant treasurer, and **Robert C. Hardy,** assistant secretary.

FRED S. DORAN, vice-president, Joseph T. Ryerson & Son, Inc., Chicago.

• **L. S. Hamaker** has been appointed assistant general manager of sales of Republic Steel Corp., Cleveland. Mr. Hamaker will transfer his headquarters to Cleveland immediately from the Berger Mfg. Division of Republic at Canton, Ohio, where he has been general manager since 1934.

• **Hugh H. Johnson,** who has been in charge of advertising for the Buick Motor Division of the General Motors Corp. for the past nine years, has been named advertising manager of Bell Aircraft Corp., Buffalo. For the past 20 years, Mr. Johnson has been associated with automotive companies as advertising counsel, and before joining the Buick Division had been with the Reo Motor Car Co. since 1922.

• **Albert H. Graf, Jr.,** has been appointed sales engineer in charge of southern territory development of the Tocco process of electrical induction for Ohio Crankshaft Co., Cleveland. His headquarters will be in Atlanta, Ga. He has been in the Cleveland office of Ohio Crankshaft since 1941, following his return from France, where for many years he served as sales manager of the Electric Furnace Co. For many years Mr. Graf was associated with Paul Heroult, inventor of the Heroult Arc Furnace.

• **Harkness W. Cram,** sales manager of the Aircraft Screw Products Co., Inc., Long Island City, N. Y., has been elected vice-president in charge of sales.

• **C. N. Barney** has been elected a vice-president of the Worthington Pump & Machinery Corp., Harrison, N. J. A member of the Worthington organization from 1918, he has been treasurer since 1931, as well as the head of the corporation's legal department.

• **Charles O. Guernsey,** vice-president of the J. G. Brill Co., Philadelphia, has, at the request of the Chief, Philadelphia Ordnance District, been granted a leave of absence by the company in order that he may accept a position as technical adviser to Col. D. N. Hauseman, deputy district chief of the Philadelphia Ordnance District.

• **J. Robert Cooper** has been named manager of the Detroit field office, Division of Motor Transport, WPB. He will administer and be responsible for the ODT program in the Michigan area, will assist the War and Navy Departments and other shippers of war materials in arranging motor transport and will help co-ordinate and pool motor vehicle equipment to meet war requirements.

• **N. H. Brodell** has been appointed metallurgical sales engineer of the Copperweld Steel Co., Warren, Ohio. Mr. Brodell is a graduate of Carnegie Institute of Technology and was previously connected with the Timken Steel & Tube Division, Pittsburgh Crucible Steel Corp. and the United Alloy Corp.

• **E. J. Schwanhausser,** vice-president, Worthington Pump & Machinery Corp., Harrison, N. J., has been elected to the corporation's board of directors, filling a vacancy created by the death of Edward T. Fishwick.

• **Frank I. Bowles** has been elected president of the Kendrick Mfg. Co., Detroit, to fill the vacancy caused by the death of the founder, Horace Kendrick, about a year ago. Mr. Bowles has been connected with the company for 25 years, for the last few years as secretary-treasurer.

• **Glenn A. Bassett,** former vice-president and treasurer of Gar Wood Industries, Inc., Detroit, has been elected president and **Garfield A. Wood,** former president, has been named chairman of the board.

• **Philip M. Pritchard,** formerly in the Chicago equipment sales division of the Hygrade Sylvania Corp., radio tube division, has been transferred to New York. He will work in conjunction with the factory purchasing and expediting department.

• **Earl B. Schwulst** has been appointed a voting trustee of the Wickwire Spencer Steel Co., New York.

OBITUARY . . .

• **Roy Carl Hicks,** assistant secretary and treasurer of Dodge Brothers, Inc., from 1914 to 1917, died April 27, aged 59 years. He was associated with the Dodge brothers from the time they entered automobile manufacture. When they acquired the Graham Brother truck plant, he became treasurer. From 1932 to 1940 he was secretary-treasurer of the Graham-Paige Motor Corp. He also served as treasurer of the American Propeller Co., Toledo, Ohio, resigning from this post in April of this year.

• **Frank S. Bigler,** retired industrialist, died April 24 at his home in Rochester, Mich., at the age of 84. Going to Detroit 40 years ago, he became manager of the Michigan Bolt & Nut Co.

• **Charles H. Campbell,** founder of the former Colonial Can Co., Boston in 1905, died April 29. He was 81 years old.

• **Wentworth C. Carr,** of Somerville, Mass., died April 29.

• **Franklin G. Hubbard,** president of Lacey Mfg. Co., Inc., Bridgeport, died April 2.

• **Max J. Clark,** former master mechanic of several plants in the automotive industry and recently a plant supervisor for the Republic Aircraft Corp., died April 27 at Detroit. Mr. Clark, 46 years old, was employed for 15 years at the Wilson Foundry Co., Pontiac, and Pontiac Motor Car Co.

• **Harold N. Scott,** president and general manager of the Fish Oven & Equipment Co., Beloit, Wis., died as the result of injuries sustained in an automobile accident several weeks previously. He was 57 years of age. For 15 years Mr. Scott was associated with the Griffin Wheel Co., Chicago. In 1938 he purchased the majority stock of the Fish firm and took over the active management.

• **Rudolph Brelie,** who with his brother, Henry C., established the Brelie Mfg. Co., Milwaukee, in 1929 for the making of gears, died April 30, aged 57 years.

• **Orrin T. Webb,** manager of the O. T. Webb Machinery Co., Milwaukee, for the past 18 years, died April 30. He was 84 years old.

• **Robert E. Hine,** associated for a number of years with SKF Industries, Inc., as Milwaukee representative, and later a professional art photographer, died May 2, aged 53 years.

• **Fred H. Dorner,** formerly with the Allis-Chalmers Mfg. Co., and the Bayley Mfg. Co., both of Milwaukee, later in business for himself as a sales engineer, died suddenly from a heart attack. He was 60 years old. Mr. Dorner was founder and past president of the Engineers' Society of Milwaukee.

• **W. R. Pendry,** superintendent of Cleveland Coke Works of American Steel & Wire Co., U. S. Steel subsidiary, died May 2. He was 67 years old. Mr. Pendry had been associated with the U. S. Steel Corp. since 1905 when he started working at the National Works of National Tube Co., McKeesport, Pa., as a draftsman. He also worked for the Tennessee Coal, Iron & Railroad Co., and Illinois Steel Co. before being employed by the Minnesota Steel Co. at Duluth. Mr. Pendry built the Cleveland Coke Works in 1916, becoming superintendent in 1917. Except for a three-year period from 1934 to 1937 when he was doing special work in the Cleveland operating department, he had been in that position ever since.

• **Albert F. Misch,** president the Almetal Universal Joint Co., Cleveland, died of a heart attack on May 1, aged 66 years. He was associated for 30 years with the old Peerless Motor Car Co. and was general manager during the five years before the company went out of business. He then was superintendent of the Miller Co., Marion, Conn., for seven years and five years ago went to Cleveland to head the Almetal company.

• **L. A. S. Wood,** chief lighting engineer, Lighting Division, Westinghouse Electric & Mfg. Co., died in Cleveland, May 6, aged 68 years. Born in London, Mr. Wood came to the United States in 1911, to introduce the flame carbon arc lamp, and subsequently became arc lamp expert for the Westinghouse company. He planned and designed the largest individual street lighting system in the United States at St. Louis, and served as lighting consultant for the Chicago Exposition and the Cleveland Great Lakes Exposition.

BOLTS—Material, Heat Treatment and Physical Properties

(*Concluded from Page 57*)

chromium-molybdenum, and, to the lesser degree, the chromium and manganese steels alone maintained a higher hardness for a given tempering temperature. In Fig. 21, the hardness is compared with the tensile strength for five alloy steels containing 0.38 to 0.43 per cent carbon and the same comparison is made for four alloy steels containing 0.30 to 0.35 per cent carbon in Fig. 22.

From these illustrations, it can be deduced that given the same carbon content for the same hardness, the tensile strength of all the alloy steels is the same. There appears to be one exception to this, however, which is that of nickel-molybdenum steel containing 0.34 per cent carbon, as in Fig. 22. The reason for this exception is that the carbon and alloy contents are not high enough to produce complete hardening throughout the section. In Figs. 23 and 24, the tensile strength of two groups of alloy steels, one group containing 0.38 to 0.43 per cent carbon and the other 0.30 to 0.35 per cent carbon, is plotted against the elongation value.

It appears from Figs. 23 and 24, that certain steels have a greater elongation at a given tensile strength than others. When this is analyzed it will be found that the steels having the highest hardness for a given tempering temperature will have the greatest elongation value for a given tensile strength. It could be tentatively stated that the steel with the greatest elongation value or ductility for a given tensile strength is the most desirable alloy steel to use for a bolt.

Micro and Macro Structures

(*Continued from Page 61*)

eters which approximated to micro rather than macro details. He suggested the use of ammonium persulphate for bringing out graphite in dendritic structures and this reagent served as the foundation for the etching procedure subsequently developed by the present authors. The use of formic acid with concentrated sulphuric acid suggested by Jurick had no apparent effect in developing the structure of the Meehanites studied.

† *Die Giesserie, Vol. 14, 1937.*

Many other common combinations of etching solutions were also tried, but they gave results that did not appear to provide the slightest differentiation between the ill-defined structures of the various Meehanite samples. It was not until the following etching procedure was developed that the authors were able to begin actual studies on the primary structure of Meehanite. A rough grinding operation through a series of belts, grit Nos. 80, 120, 240, and 320, was the only preparation necessary prior to etching in the following manner:

(1) 2.5 gm. (0.088 oz.) of ammonium persulphate in 100 cc. of water, specimen swabbed for 15 min.

(2) 1.5 gm. (0.0428 oz.) of potassium iodide added and specimen swabbed for 10 min. more.

(3) 1.5 gm. (0.0428 oz.) of mercuric chloride added and specimen again swabbed for 5 min.

(4) 15 cc. (0.9172 oz. of sulphuric acid added and swabbing continued for 5 min.

The specimen was finally washed in water and dried with alcohol. No doubt some variations in the amounts of reagents added would not seriously modify the results obtained, but the amounts suggested appeared to provide optimum conditions. The results obtained from this procedure were very informative and a clear picture of the primary structure of the Meehanite could readily be seen by a visual examination with the unaided eye.

The method of reproduction available has been discussed previously and the etched figures herein presented were recorded at three diameters with the Bausch and Lomb 72 mm. micro tessar using vertical illumination.

In Figs. 19 and 20 may be noted the etched structure of the transverse section of two Type GA Meehanites of identical chemical composition, but poured from the ladle at two different casting temperatures. The effect of pouring temperature is clearly profound.

Tests on Sample Bars

Four arbitration bars of Type GA Meehanite were cast from progressively lower pouring temperatures. Tensile test specimens were machined according to the A.S.T.M. standard specifications for gray iron, 0.505 in. diameter and 1 in. gage length. Transverse strength, deflection, and Brinell hardness data were also obtained. The results recorded on bars poured at 2700, 2530, 2470 and 2390 deg. F. are shown in Table I.

The transverse etched macrostructures of these four bars are illustrated at three diameters in Figs. 21, 22, 23, and 24. In the first three figures, the presence of primary dendritic structure is clearly shown. However, it may be noted that the casting made from the highest pouring temperature studied, and exhibiting the highest tensile strength of the group, shows

TABLE I

Results of Tests Made on 1.2-In. Diameter Arbitration Bars

Test	Pouring Temperatures			
	2700 Deg. F.	2530 Deg. F.	2470 Deg. F.	2390 Deg. F.
Tensile, lb. per sq. in.	49,100	47,300	42,600	39,400
Transverse strength, lb. per sq. in.	3,200 lb.	3,000 lb.	2,950 lb.	2,850 lb.
Deflection	0.430 in.	0.365 in.	0.360 in.	0.365 in.
Brinell hardness	217	217	217	217

the persistence of dendrite formation to the peripheral parts of the bar.

In the case of the bar poured at the lowest temperature, 2390 deg. F. in Fig. 24, a fine "macro structureless" feature, free from any evidence of dendritic pattern, is obtained. With the bar poured at a slightly higher temperature, 2470 deg. F., it may be noted that the dendritic pattern is confined to the center portion of the arbitration bar.

It is of interest to point out that in cast materials the coarse dendritic patterns observed in Figs. 21 and 22 have usually been associated with low mechanical strength, whereas the fine uniform dendrite-free pattern obtained with low pouring temperature, shown in Fig. 24, has been associated with superior mechanical properties.

Reference to the tabulated data will reveal that in these Type GA Meehanite castings, high casting temperature gives the most fully developed dendritic structure and also results in the optimum tensile property.

Referring back to Figs. 19 and 20, which were presented to indicate the development of a macro etching technique, it may be stated that a similar correlation was observed. In this series of arbitration test bars the casting made at the higher temperature and showing marked dendrite formation, shown in Fig. 19, gave a tensile of 50,000 lb. per sq. in., whereas that cast at a lower temperature and entirely free from macro dendrites showed a tensile of 40,200 lb. per sq. in. A third cast in this series poured from the highest casting temperature had a tensile strength of 58,200 lb. per sq .in. The macropicture has not been reproduced but the structure was in general similar to that shown in Fig. 19, except that the dendrites were slightly coarser.

Further investigations on the correlation between macrostructure and tensile strength are likely to reveal that the reason for the association of high tensile properties with coarse macro dendritic growth is dependent on the following concept: When conditions of casting are such as to lead to the formation of a coarse dendritic appearance on a macro etched section, these conditions promote the formation of very coarse austenitic dendrites during solidification. On cooling through the critical, the long dendrites transform to continuous pearlite colonies which confer strength to the casting.

Aluminum Can Be Brazed

THE brazing of aluminum, like any other metal, depends upon the availability of aluminum alloys with melting points lower than the parent metal and fluxes which will dissolve oxides at brazing temperature. Such alloys and fluxes were not available until early in 1939 when the Aluminum Co. of America announced that its research laboratory had perfected suitable filler alloys and fluxes for brazing the following aluminum alloys:

2S—commercially pure aluminum.

3S—1.2 per cent manganese, remainder aluminum.

61S—0.55 per cent. silicon, 0.95 magnesium, 0.25 copper, 0.25 chromium, remainder aluminum.

The filler or brazing alloy varies with the parent alloy. The fluxes are basically fluoroxide salts with other constituents added to vary their melting point. (Flux must be fluid and active at brazing temperature.)

The filler material is usually applied in the form of wire or sheet washer in a manner similar to the method used in the other metals. 2S and 3S sheet, however, can also be obtained with an Alclad brazing-alloy coating integral with the parent sheet. The design of joints follows largely that of copper-brazed joints.

The brazing of aluminum lends itself to several methods of heating: Namely, furnace, torch and by dipping in molten flux. The strength of brazed joints in aluminum alloys is about the same as the strength of torch-welded joints.

Typical physical values of furnace-brazed butt joints are:

Alloy	Tensile Strength, lb. per sq. in.	Per Cent Elongation
2S	15,000	7.0
3S	19,000	3.0
61S	*34,000	3.0

* Heat-treated condition.

In this connection, it should be noted that the temperature of brazing will anneal aluminum alloys, and, therefore, parts either furnace or dipped-brazed of 2S or 3S will be fully annealed. 61S, on the other hand, relies on heat treatment for maximum physical strength, and it is possible to heat-treat parts brazed of 61S alloy. Sometimes the brazing cycle and heat treatment can be combined particularly in furnace brazing.

Since the filler alloys are aluminum-base alloy, there is no marked electrolytic corrosion of aluminum brazed joints, as in the case of soldered joints, and brazed joints should be satisfactory for many industrial applications.

It is physically possible to soft solder aluminum, but, unless the joint is fully protected by means of paint or some other protective coating, the joint will disintegrate due to the galvanic corrosion between the aluminum and the solder. Spot welding or brazing of aluminum is always preferred.

To soft solder it at all, the aluminum must first be "tinned" with a suitable solder. To "tin" aluminum, the surface must be vigorously rubbed with a soldering iron or wire brush through the surface layer of liquid solder to remove the oxide on the aluminum surface and to prevent its reforming while in contact with air. Once the surfaces have been tinned, they can be sweated together without any difficulty.

MACHINE TOOLS

. . . SALES, INQUIRIES AND MARKET NEWS

Midwest Pool Plan May Be Abandoned

Chicago

• • • **Proposals to farm** out .30 and .50 cal. bullet cores to small machine shops, garage repair shops, and other small enterprises in this midwest section are nearing dangerous waters. The plan was built around the use of a special purpose small lathe of the 10 in. size which would sell around $1000 and be available on installment purchases. A lathe manufacturer built several of the machines under the aegis of the local Office of Contract Distribution and it was reported that about four cores a minute could be made with an inexperienced operator—man or woman. After demonstrations of the machine, which created enormous excitement among potential small subcontractors, it was assumed that the plan was all set for execution.

However, the Ordnance Department and its machine tool advisors here, after testing two of the machines in a nearby town, found that production attained was only around 40 an hr. This brought machining cost alone up in the neighborhood of $15 per thousand cores. The machine tool specialists also felt that there was enough existing equipment in the automatic line that could be squeezed into use for this job. Their argument was basically one of costs—since the preliminary investigations showed a tremendous gap between cost on the small specially built machine compared to that on multiple spindle equipment.

They also argued that management of a job that would be literally scattered to the four winds would be nothing more than a headache. So, temporarily the "go ahead" signal on the small machine was held up while scouts were sent out to seek available equipment. Informed sources have told THE IRON AGE enough equipment has been turned up in this area to make more than 500,000 cores a day. The figure required ultimately will be much higher than this, but opinion seems to be that more capacity will be uncovered. The plan embracing the special equipment is still on the fire, but its position seems to have weakened considerably and it is not at all unlikely that this particular proposal may be abandoned.

Cincinnati Builders Earn Praise of Investigators

Cincinnati

• • • **That efforts** of the machine tool manufacturers in Cincinnati are meeting with government approbation, was indicated in the first of a series of field surveys conducted by the Supply Services of the War Department and WPB. Industry throughout the area is displaying "unfailing determination" to make the maximum contribution of its production to the war effort, according to the report. "They are working with the keenest enthusiasm. The advice of Mr. Donald Nelson to produce now and settle details later has been heard and heeded."

This was the "pat on the back" that the inspectors gave local industry after their survey which was conducted from March 31 to Apirl 9, and resulted in a 31 page report of the extensive tabulation of industrial accomplishments.

No change was reported in the general picture in the local market during the past week. New business is still running in peak proportions without much prospect of early retardation.

In these times when quick repairs are of the utmost importance, when makers of experimental parts, when tool and die workers are busy, it will pay to have an ample supply of XLO Music Wire.

This high grade steel spring wire comes to you attractively packaged in red and silver in units of ¼ lb., ½ lb., and 1 lb., and 5 lb. packages. Wire sizes from .003 to .200.

Johnson Steel & Wire has enlisted heavy production of XLO Music Wire for the war.

JOHNSON STEEL & WIRE CO., INC.
WORCESTER • MASSACHUSETTS

NEW YORK — AKRON — DETROIT — CHICAGO — LOS ANGELES — TORONTO

NON-FERROUS METALS

. . . MARKET ACTIVITIES AND PRICE TRENDS

WPB Halts Production Of 100 Copper Products

• • • **An additional hundred-odd** civilian products have been added by WPB to the list of items which may no longer be manufactured in copper or its alloys. The new list "A-1" is in addition to list "A," and prohibits manufacture, assembly or finishing of a variety of items ranging from hearse hardware to weight reducing machines after May 31. Among other banned items are bulbs and neon or fluorescent tubes for advertising and display purposes, Christmas tree bulbs and cords and musical instruments. The action came as a revision of the frequently amended order, M-9-c.

No further processing of items on the list is permitted if the raw material is in substantially the same form in which it was acquired. Regardless of whether they appear on the lists, no copper bearing products may be made after June 15 if the raw material was acquired prior to Feb. 28, unless they carry a rating of at least A-1-k. If the copper was obtained after Feb. 28 and is being used to make articles appearing on the lists, WPB assumes that the material was properly allocated and no further restriction is necessary. Application Form PD-426 may be used to request exceptions from this order.

The previous exemption granted for parts used to conduct electricity is removed, and articles appearing on the lists may not be copper plated after May 31. The restrictive provisions of the order do not apply to Army, Navy, or Maritime Commission contracts until Aug. 1.

The use of copper or copper base alloys in all but essential operating parts of motor vehicles is prohibited in WPB Limitation Order L-106, effective immediately. The following are among the 13 products which do not come under the provisions of the order: Radiators and cooling system controls; electrical equipment; tubes and fittings; bearings and thrust washers; certain types of transmissions, powdered copper for bearings and copper alloys for certain other parts. The order does not apply to Army or Navy contracts whose specifications call for copper or copper base alloys.

Slab zinc production for April held at the monthly average for 1942, according to data released by the American Zinc Institute. The April figure of 77,034 tons was off about 2000 tons from March, but allowing for the extra working day in March, daily production was actually up slightly. Total shipments for April were 76,177 tons, off 4000, but domestic deliveries increased by approximately 2250 tons to 63,819 tons.

Lead producers have received release from the WPB for shipment of the major part of the domestic 15 per cent May emergency pool. A small amount is left in reserve for needs that may develop later. The use of lead in building supplies is not restricted as severely as it originally appeared to be in the WPB order banning the use of lead in a number of products. Amendment No. 1 to this order L-42 permits the use of lead in preserving finishes on plumbing fixtures.

Non-Ferrous Prices

(Cents per lb. for early delivery)

Copper, Electrolytic[1]	12.00
Copper, Lake	12.00
Tin, Straits, New York	52.00
Zinc, East St. Louis[2]	8.25
Lead, St. Louis[3]	6.35

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 15c.-16c. a lb.; No. 12 remelt No. 2, standard, 14.50c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt; Asiatic, nominal, New York; American, 14.50c. a lb., f.o.b. smelter. QUICKSILVER, $197 to $199 per 76 lb. flask, f.o.b. shipping point. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.

"HERCULES" RED-STRAND WIRE ROPE

You Can Depend On "Hercules" (Red Strand) Wire Rope

Highlights of Quality

1. Acid Open-Hearth Steel Wire
2. Rigid Tests and Inspections
3. Correct Manufacturing Methods
4. Furnished in both the Round and Flattened Strand constructions, in either Standard or Preformed Type.

• • Results are what count, and the performance record of this wire rope continues to make and hold friends.

There is no guess work when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. If you will tell us how you use wire rope, we shall be glad to suggest the construction and type most suitable for your conditions.

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS — ESTABLISHED 1857

5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK • • • 90 West Street
CHICAGO • • 810 W. Washington Blvd.
DENVER • • • 1554 Wazee Street
SAN FRANCISCO • • • 520 Fourth Street
PORTLAND • • 914 N. W. 14th Avenue
SEATTLE • • 3410 First Avenue South

Licenses Seen as Club To Force Compliance

• • • **OPA's final** and most powerful effort to stamp out illegal practices, the licensing program for scrap dealers which becomes effective May 20 has brought an atmosphere of expectancy in markets over the nation.

The past week also brought two other developments: First, reports from St. Louis and Pittsburgh indicate that scrap is not moving to steel companies against which the government recently took court action, and secondly, scrap dealers and brokers have been told informally that where grades of different prices are shipped in one vehicle, the price of the lowest grade shall govern the price of all material in that vehicle. There had not been any formal announcement of the latter ruling up to Tuesday of this week. Seemingly, it eliminates the $2.50 differential, source of complaint and hardship. Loading of vessels has been slowed by the one grade ruling. The usual practice is to ship several kinds of scrap in one boat, but during the past week at some ports scrap was being dumped on the ground until enough of one kind could be accumulated.

At OPA it was said Tuesday that it had not eliminated the $2.50 differential on mixed scrap. It was stated, however, that OPA is considering an amendment to the mixed shipment paragraph providing a price of $2.50 under the maximum price applicable to the lowest grade in the shipment.

Discussing Supplementary Order No. 5 (the licensing order, text of which is printed upon the next page), Price Administrator Henderson said that evasions of price schedules have presented difficult problems and that "Experience has indicated that a technique of enforcement more comprehensive and flexible than that heretofore used, must be employed."

OPA's apparent reversal in judgment on the one-grade situation came so quickly that probably no lasting harm in holding up scrap supplies and unduly delaying freight cars will occur, although it was noticeable at Pittsburgh last week that the initial ruling was a definite threat to steel production.

• • • **Two Western** scrap metal dealers, operating four scrap yards in three states, have been ordered penalized for alleged priority violations. Suspension Order S-51, directed against Reuben and Ralph Finkelstein, individually or trading as the Capital Iron and Metal Co., and the Capital Compressed Steel Co., Oklahoma City, Okla., charges them with refusal to execute three iron and steel scrap allocation orders, each of which directed the two companies to ship 1000 tons of open-hearth steel scrap to the Sheffield Steel Corp. before shipping any of the same grade of scrap to other users.

OPA Court Action Brings Hesitation

Chicago

• • • **The reaction** to the recent Federal court action ordering Northwestern Steel & Wire and 26 of its scrap suppliers to comply with government regulations has been a slow movement of scrap. Contributing to the hesitation is the almost certain knowledge that OPA will soon bring into court two more local mills and their scrap suppliers. This new action is expected any day and is generally expected to include important brokers and dealers.

The reason for the fear is the nature of the Northwestern action, which was strictly a charge based on hair-line legal interpretations of grades of scrap as defined by government regulations. Since neither the defendants nor the OPA apparently understand the legal twists to the charge they cannot be explained here. However, "upgrading" was the overall term applied to the action—and the scrap firms involved apparently feel that the specific transactions were within accepted custom and that the charges were prepared by those unfamiliar with scrap, its uses and trading conditions.

Brokers claim they are unable to inspect every car and feel that as long as the mill accepts a car it should be regarded as meeting requirements during the war emergency.

(Turn Page for More Scrap News)

WESTINGHOUSE

welds "down-hand" on C-F POSITIONERS

● "Welding motor frames for 100 or 125 ton Westinghouse Diesel Electric Locomotives on Cullen-Friestedt Positioner."

It's production line welding on C-F Positioners that is saving many man-hours in fabricating, these days. The work is "set-up" just once and from then on the welder positions the weldment with a push button. He can turn it 360° and tilt it 135° (from horizontal) to lay better fillets, "down-hand." Here is faster welding and, because of less handling, safer welding. C-F Positioners are made in capacities from 1200 lbs. to 14000 lbs., hand or power operated. Our booklet WP-20 is an interesting, fact-giving circular, which you should have. We will gladly mail you a copy on request.

CULLEN-FRIESTEDT CO.,
1303 S. KILBOURN AVE. CHICAGO, ILLINOIS

Text of New Order Licensing Dealers

• • • Here is the text of Supplementary Order No. 5, licensing dealers selling waste, scrap and salvage materials to consumers (and in the case of iron and steel scrap, to consumers or their brokers):

(A) *License granted:* Effective May 20, 1942, every dealer now or hereafter selling to a consumer (and in the case of iron and steel scrap, to a consumer or his broker) any waste, scrap or salvage material for which maximum prices are established by price schedules and price regulations Nos. 2, 3, 4, 8, 12, 20, 30, 47, 55, 70, 87, 90, 115 and 123 respectively (as now or hereafter amended or supplemented), is by this Supplementary Order No. 5 granted a license as a condition of selling any such waste, scrap or salvage material. The license granted by this Supplementary Order No. 5 shall, unless suspended as provided by the Act, continue in force so long as, and to the extent that, any of the aforementioned price schedules and price regulations, or any amendment or supplement thereto, remains in force.

(B) *Registration of licensees:* (1) Every dealer hereby licensed (hereinafter sometimes called "licensee") is required to register with the OPA on or before June 20, 1942; or if such dealer begins selling as aforesaid, for the first time after said last mentioned date, then within five days after the first such sale. Registration shall be accomplished by filing with the OPA a registration statement on OPA Form No. SO5:1 obtainable at the Washington, D. C., office, or at any regional, state or district office of the OPA. Every licensee owning, operating, or maintaining more than one place of business shall file a separate registration statement for each place of business. In case a new, additional or different place of business is later established or acquired by a dealer now or hereafter subject to the provisions of this Supplementary Order No. 5, such dealer shall within five days after establishing or acquiring it, file a registration statement with respect to such now, additional or different place of business.

(2) The OPA will issue to each dealer registering pursuant to this paragraph (b), and for each place of business so registered, a registration certificate upon completion of registration.

(C) *License not transferable:* The license hereby granted is not transferable.

(D) *Suspension of license:* Licensees violating any of the provisions of the license granted by this Supplementary Order No. 5; or violating any of the provisions of the price schedules or price regulations, or any amendment or supplement thereto, specified in paragraph (a), or violating the provisions of any applicable regulation, order or requirement issued under Section 202 (b) of the Act, are subject to the license suspension proceedings provided for in said Act: *Provided, however*, That no proceedings for the suspension of a license, and no suspension, shall confer any immunity from any other provision of the Act.

(E) *Definitions:* When used in this Supplementary Order No. 5 the term:

(1) "Dealer" means an individual, corporation, partnership, association, or any other organized group of persons, or the legal successor or representative of any of the foregoing, whose business includes the acquisition of any material for the purpose of sale as waste, scrap or salvage material.

(2) "Consumer" has the meaning and definition, when applied to a particular waste, scrap or salvage material, which is given it by the price schedule or the price regulation fixing a maximum price for such material.

(3) "Price schedule" and "price regulation" means a price schedule effective in accordance with the provisions of Section 206, or a maximum price regulation issued under Section 2, of the Emergency Price Control Act of 1942, issued by the OPA or any amendment or supplement to such a maximum price regulation or price schedule, or any regulation, order or requirement issued pursuant to any such regulation or schedule.

(4) "Act" means the Emergency Price Control Act of 1942.

(F) *Effective date:* This Supplementary Order No. 5 shall become effective May 20, 1942.

House Committee Reports Hoarding Exaggerated

Washington

• • • In an interim report made public last Thursday, the Special House Committee on Materiel, Procurement and Personnel of the Committee on Military Affairs, dismissed charges of iron and steel scrap hoarding made by SWOC President Philip Murray and others and recommended that normal processes and procedures for handling scrap be permitted to continue under the "qualified leadership of established trade agencies."

The report pointed out that present agencies:

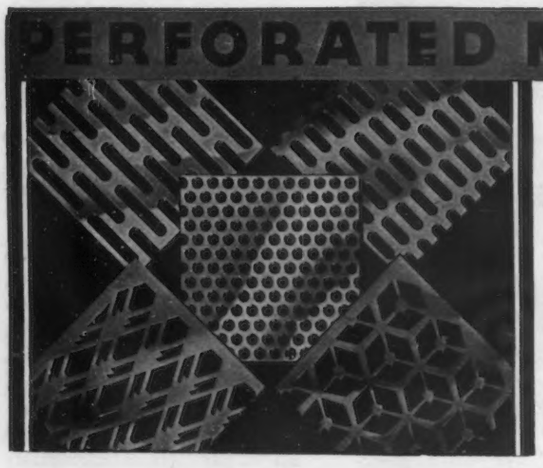
1. Have the knowledge, gained from experience, requisite for finding, collecting, and speedily processing industrial as well as dormant scrap; and how and where to market it;
2. Have, and know how to use, the necessary machinery and equipment;
3. Faithful performance is assured by their responsibility to such Government agencies as the War Production Board and the OPA.
4. Have performed efficiently and without detriment to the public welfare in the past.

Obsolete Ammunition Now Made Available As Scrap

• • • More than 13,500 net tons of steel and 500,000 lb. of copper in British projectiles, made obsolete by loss of equipment at Dunkirk, have been made available as scrap through the efforts of the WPB Industrial Salvage Section, negotiating with the British Purchasing Commission, it was announced last Friday. The scrap will be made available to American munitions manufacturers, a WPB spokesman said.

Defunct Road Scrapped

• • • A wrecking crew employed by the War Department last week began tearing up and shipping the steel from the defunct New York, Westchester & Boston Railroad.



• INDUSTRIAL AND ORNAMENTAL •

ANY METAL

ANY PERFORATION

•

• Making holes is our entire business and we've made billions and billions of them—little ones, big ones, round, square, oblong and slot holes besides shapely ones in many beautiful designs. Our service is at your command.

The Harrington & King PERFORATING Co.

5657 FILLMORE ST., CHICAGO

114 LIBERTY ST., NEW YORK

SCRAP PRICES

(All the prices given below are per gross tons and are basing point prices from which shipping point prices and consumer's delivered prices are to be computed)

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

	BASIC OPEN HEARTH GRADES (No. 1 Heavy Melting; No. 1 Hydr. Compressed Black Sheets; No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)	Machine Shop Turnings	BLAST FURNACE GRADES (Mixed Borings and Turnings; Shovelling Turnings; No. 2 Busheling; Cast Iron Borings)	ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES											
				Low Phos.			Heavy Structural and Plate			Cut Auto. Steel Scrap			Alloy free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
				Billet, Bloom, Forge Crops	Bar Crops and Smaller	Punchings and Plate	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under			
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	$20.00	$16.00	$16.00	$25.00	$22.50	$22.50	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	15.50	15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt.	18.75	14.75	14.75	23.75	21.25	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Ashland, Ky.	19.50	15.50	15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	15.25	15.25	24.25	21.75	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	14.25	14.25	23.25	20.75	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth, Minn.	18.00	14.00	14.00	23.00	20.50	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	13.85	13.85	22.85	20.35	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo, Ohio	.....	13.85	13.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo.	17.50	13.50	13.50	22.50	20.00	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	13.00	13.00	22.00	19.50	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	12.50	12.50	21.50	19.00	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle, Wash.	14.50	10.50	10.50	19.50	17.00	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50
Portland, Ore.	.....	.....	.....	.....	15.50	15.50	14.00	14.50	15.00	13.00	13.50	14.00	11.00	12.50	14.00

BUNDLES consisting exclusively of tin coated material and compressed into charging box size, are $4 per gross ton below No. 2 dealers' bundles. Bundles containing tin coated material but not composed exclusively of such material (outlawed by order M-24-b) are $8 below No. 2 dealers' bundles.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Published dock charges prevail, or if unpublished 75c. per ton must be included as part of the deduction.* Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus lowest switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

*At Memphis deduct 50c.; Great Lakes ports $1; New England $1.25.

REMOTE SCRAP: Defined as all grades of scrap listed in table above located in North Dakota, South Dakota, Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon and Utah. The delivered price of remote scrap may exceed by more than $1, but not more than $5, the price at the basing point nearest the consumer's plant, provided detailed statement under oath is furnished OPA. Where delivered price would exceed by more than $5 the price at basing point nearest consumer, user must apply to OPA for permission to absorb the additional charges. For exceptions see official order.

UNPREPARED SCRAP: The maximum prices established hereinabove are maximum prices for prepared scrap. For unprepared scrap, maximum prices shall be $2.50 less than the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge $2.50 per ton on consumer-owned unprepared remote scrap (see order).

Where more than one grade of scrap is included in a shipment, the shipment is to be classified as unprepared scrap and shall be priced at $2.50 per gross ton below the maximum price applicable to the lowest grade in the shipment.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

CAST IRON BORINGS: (No more than 0.5 per cent oil content; for chemical use), add $5 to price of cast iron borings.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of $2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA, of the shipping point, transportation charges and details of the sale.

RAILROAD SCRAP

(Per gross ton, delivered consumers' plants located on line.)

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails 3 ft. and Under	Scrap Rails 2 ft. and Under	Scrap Rails 18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown	$20.50	$21.50	$23.00	$23.50	$23.75	$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington, Birmingham, Los Angeles, San Francisco	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	18.00	19.00	20.50	21.00	21.25	21.50
Detroit	20.25	21.25	22.75	23.25	23.50	23.75
Duluth	18.85	19.85	21.35	21.85	22.10	22.35
Kansas City, Mo.	19.00	20.00	21.50	22.00	22.25	22.50
Kokomo, Ind.	17.00	18.00	19.50	20.00	20.25	20.50
Seattle	19.25	20.25	21.75	22.25	22.50	22.75
St. Louis	15.50	16.50	18.00	18.50	18.75	19.00
	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

Other Than Railroad Scrap

	Group A	Group B	Group C
No. 1 machinery cast, drop broken, 150 lbs. and under	$18.00	$19.00	$20.00
No. 1 cupola cast	18.00	19.00	20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	17.50	18.50	19.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	16.50	17.50
Charging box size cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B; switch district of Kansas City, Kan., Mo.

Comparison of Prices . . .

(Advances Over Past Week in **Heavy Type**; Declines in *Italics*. **Prices Are F.O.B. Major Basing Points**)

Flat Rolled Steel: (Cents Per Lb.)	May 12, 1942	May 5, 1942	Apr. 14, 1942	May 13, 1941
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 135 to 144 herein.

Pig Iron: (Per Gross Ton)	May 12, 1942	May 5, 1942	Apr. 14, 1942	May 13, 1941
No. 2 fdy., Philadelphia	$25.89	$25.89	$25.84	$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.68	24.68	24.06	24.06
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.39	25.34	25.34	25.34
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	31.34	31.34	31.34	31.34
Ferromanganese‡	135.00	120.00	120.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)	May 12, 1942	May 5, 1942	Apr. 14, 1942	May 13, 1941
Heavy melting steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
N. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	....
Low phos. plate, Young'n	22.50	22.50	23.00	....
No. 1 cast, Pittsburgh	20.00	20.00	20.00	22.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	24.00
No. 1 cast, Ch'go	20.00	20.00	20.00	21.00
Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$6.00	$6.00	$6.00	$6.125
Foundry coke, prompt	6.875	6.875	6.875	6.875
Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Copper, electro, Conn.*	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.25
Zinc, East St. Louis	8.25	8.25	8.25	7.25
Lead, St. Louis	6.35	6.35	6.35	5.70
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

*Mine producers only.

Composite Prices . . .

	FINISHED STEEL	PIG IRON	SCRAP METAL
May 5, 1942	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP METAL HIGH	SCRAP METAL LOW
1942	2.30467c.,	2.30467c.,	$23.61	$23.61	$19.17	$19.17
1941	2.30467c.,	2.30467c.,	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99629c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71 May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

DON'T LET RUST GET A GRIP ON YOUR TURBINES

TESTED, proved in use by leading utilities and turbine manufacturers, *new* Shell Turbo Oil meets *all three* requirements of modern turbine lubrication . . .

RUST PREVENTION
SUPERIOR OXIDATION STABILITY
MINIMUM FOAMING TENDENCY

Before you sweeten or drain and change oil, get the details on the *new* Shell Turbo Oil. Call in Shell today!

SHELL

Lubricate with RUST-PREVENTIVE

SHELL TURBO OIL

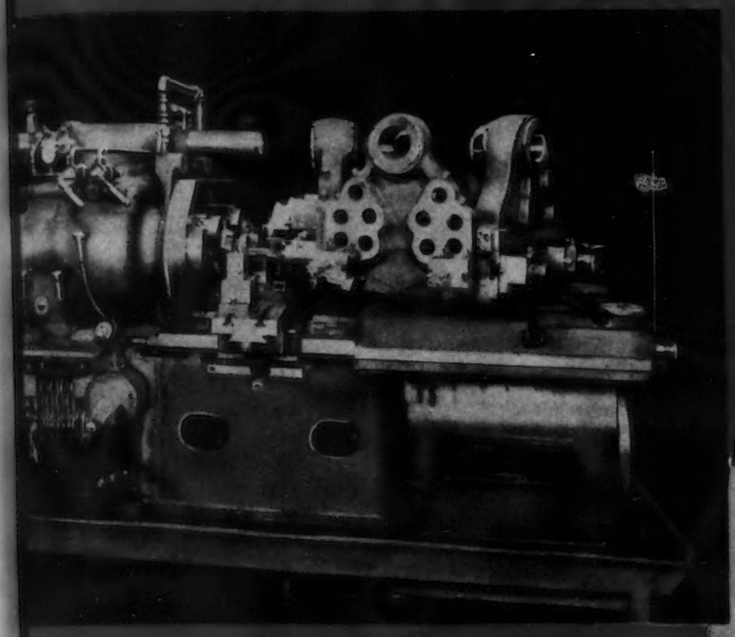
Prices of Finished Iron and Steel . . .

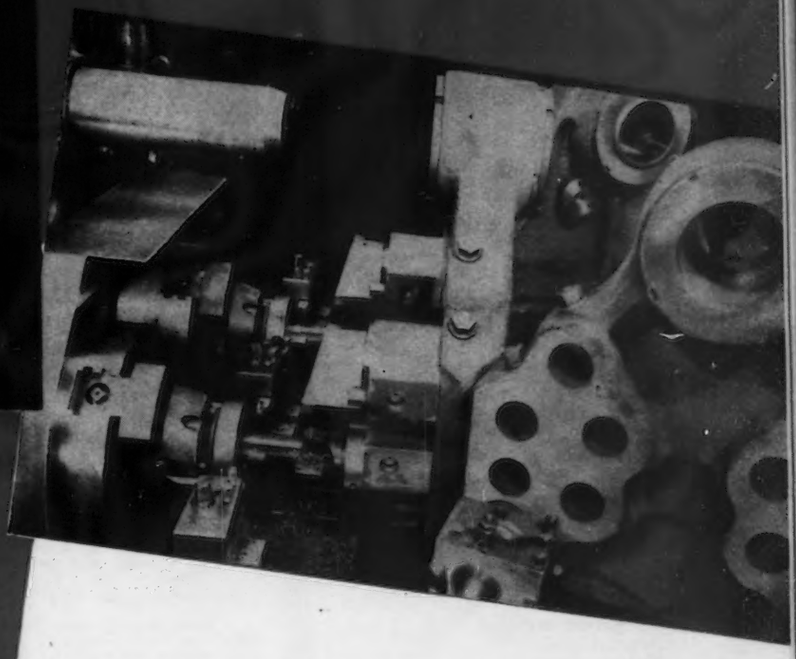
Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars [10]	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.22¢	2.35¢	2.28¢
Cold rolled [1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.17¢	3.41¢	3.39¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.75¢	3.68¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.47¢	3.73¢	3.69¢
Long ternes [2]	3.80¢		3.80¢									4.55¢		4.18¢	4.14¢
STRIP															
Hot rolled [3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.22¢	2.48¢	
Cold rolled [4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester =3.00¢)					2.92¢	3.18¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.58¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester =3.35¢)					3.07¢	3.33¢	
TIN PLATE															
Standard cokes, base box	$5.00	$5.00	$5.00						$5.10					5.38¢	5.34¢
BLACK PLATE															
29 gage [5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ [13]			3.39¢
TERNES, M'FG.															
Special coated, base box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth =2.25¢)			2.52¢	2.80¢	2.27¢	2.51¢	2.49¢
Rail steel [6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.52¢	2.80¢			
Reinforcing (billet) [7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.52¢	2.55¢ [14]	2.27¢	2.40¢	
Reinforcing (rail) [7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.52¢	2.55¢ [14]	2.27¢		2.49¢
Cold finished [8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit =2.70¢)					3.01¢	2.99¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢	(Bethlehem, Massilon, Canton =2.70¢)						2.82¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.47¢		
PLATES								(Coatesville and Claymont =2.10¢)							
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢ [11]		2.47¢	2.65¢	2.27¢	2.30¢	2.155¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.72¢	4.00¢		3.73¢	3.69¢
Alloy	3.50¢	3.50¢			(Coatesville =3.50¢)						3.97¢	4.15¢		3.71¢	3.60¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem =2.10¢)			2.47¢	2.75¢		2.28¢	2.22¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester =3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester =4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester =6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester =8.55¢)								
WIRE [9]															
Bright [15]	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester =2.70¢)					3.10¢			2.94¢
Galvanized	add proper size extra and galvanized extra to bright wire base, above.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester =3.30¢)					3.70¢			3.54¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.74¢
IRON BARS [12]															
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] These prices do not apply if the customary means of transportation (rail and water) are not used. [11] Ship plates only. [12] Common iron bars quoted at 2.15c. by Terre Haute, Ind. producer. [13] Boxed. [14] Portland and Seattle price, San Francisco price is 2.50c. [15] This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

*Results FROM PLANNED PRODUCTION ON A P&J 5D Two Spindle POWERFLEX





* 23 TRACTOR PARTS PER 51-MINUTE HOUR.

THE JOB AND HOW IT IS HANDLED

Part: Tractor Track Roller Shaft Bracket
Material: Malleable Iron
Machining Time: One operation only—Two subjects 3.91 minutes
Floor to Floor Time: 4.21 minutes
Production: 23 Brackets per 51 minute hour

Operation: Cross slide operates simultaneously with the tools mounted on turret allowing rough and finish facing cuts to be taken without loss of time. It also provides an operating mechanism for auxiliary slide tool mounted on turret face. Tools mounted on the auxiliary slide tool are used for machining of angular recess groove.

Machining Operations:
1st T.F.: Rough bore hole; bore and face 3⅝" dia. bore O.D.
2nd T.F.: Rough face end; rough machine groove for belt oil seal
3rd T.F.: Finish bore hole; bore and face 3⅝" face end
4th T.F.: Finish machine groove
5th T.F.: Ream hole

The advantages of 2-spindle output from single spindle floor space as well as savings in power and initial investment are being realized in many shops where these P&J automatic Chucking Machines are installed.

A recent installation in the plant of a mid-western tractor manufacturer exemplifies these advantages. Note from the photographs the simple form of tooling required for producing track roller shaft brackets. The tool holders mounted on the several turret faces as well as the extremely rigid form of overhead pilot are features included in the standard 2-spindle machine at no extra cost.

P&J offers the 5-D 2-spindle POWERFLEX in three sizes, 9", 12" and 15". The outstanding characteristics of all sizes are extreme rigidity of spindle mounting, turret slide and cross slide, long life, and maintained accuracy under high production demands.

On the class of work shown here, one operator can readily handle three machines of this type.

POTTER & JOHNSTON MACHINE CO.

PAWTUCKET, RHODE ISLAND

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.25 higher; f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.
Prices delivered Detroit are $2.25 higher.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)	*Per Lb*
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem, per gross ton $54.00

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per Lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorous	Charcoal
Boston††	$25.53	$25.03	$26.53	$26.03	.....	.....
Brooklyn	27.65	.....	.....	28.15	.....	.....
Jersey City	26.62	26.12	27.62	27.12	.....	.....
Philadelphia	25.89	25.39	26.89	26.39	.....	.....
Bethlehem, Pa.	**$25.00**	**$24.50**	**$26.00**	**$25.50**	.....	.....
Everett, Mass.††	**25.00**	**24.50**	**26.00**	**25.50**	.....	.....
Swedeland, Pa.	**25.00**	**24.50**	**26.00**	**25.50**	.....	.....
Steelton, Pa.	.....	**24.50**	.....	.....	**$29.50**	.....
Birdsboro, Pa.	**25.00**	**24.50**	**26.00**	**25.50**	**29.50**	.....
Sparrows Point, Md.	**25.00**	**24.50**	.....	.....	.....	.....
Erie, Pa.	**24.00**	**23.50**	**25.00**	**24.50**	.....	.....
Neville Island, Pa.	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Sharpsville, Pa.*	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Buffalo	**24.00**	**23.00**	**25.00**	**24.50**	**29.50**	.....
Cincinnati	24.68	24.68	.....	25.18	.....	.....
Canton, Ohio	25.47	24.97	25.97	25.47	.....	.....
Mansfield, Ohio	26.06	25.56	26.56	26.06	.....	.....
St. Louis	24.53	24.05	.....	.....	.....	.....
Chicago	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....$31.34
Granite City, Ill.	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Cleveland	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Hamilton, Ohio	**24.00**	**23.50**	.....	**24.00**	.....	.....
Toledo	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Youngstown*	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Detroit	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Lake Superior fc.	.....	.....	.....	.....	.....	**$28.00**
Lyles, Tenn. fc.†	.....	.....	.....	.....	.....	**33.00**
St. Paul	26.76	.....	27.26	26.76	.....	.....
Duluth	**24.50**	.....	**25.00**	**24.50**	.....	.....
Birmingham	**20.38**	**19.00**	**25.00**	.....	.....	.....
Los Angeles	27.25	.....	.....	.....	.....	.....
San Francisco	27.25	.....	.....	.....	.....	.....
Seattle	27.25	.....	.....	.....	.....	.....
Provo, Utah	**22.00**	.....	.....	.....	.....	.....
Montreal	27.50	27.50	.....	28.00	.....	.....
Toronto	25.50	25.50	.....	26.00	.....	.....

GRAY FORGE IRON

Valley or Pittsburgh furnace **$23.50**

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at $1 per gross ton above maximum prices.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

†Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. See THE IRON AGE, *Dec. 25, 1941, page 88, for details of OPA Price Schedule No. 49, covering steel resale prices. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. city prices are used in conformance with Schedule 49.)*

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los Angeles†
Sheets, hot rolled	$3.35	$3.25	$3.35	$3.55	$3.58	$3.43	$3.25	$3.71	$3.45	$3.39	$3.50	$3.38	$4.95
Sheets, cold rolled	....	4.10	4.05	4.05	4.60	4.30	4.30	4.68	....	4.24	4.35	4.23	7.50
Sheets, galvanized	4.65	4.85	4.62	5.05	5.00	4.84	4.75	5.11	4.75	4.99	5.00	4.98	5.95
Strip, hot rolled	3.60	3.60	3.50	3.51	3.96	3.68	3.82	4.06	3.70	3.74	3.85	3.73	4.90
Strip, cold rolled	3.20	3.50	3.20	3.31	3.51	3.40	3.52	3.46	....	3.61	3.83	3.54	....
Plates	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.90
Structural shapes	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.60
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	4.35
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.45	7.35	7.55	7.31	7.60	7.67	7.35	7.75	....	7.72	7.45	7.58	9.55
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300	8.40	8.40	8.40	8.56	8.84	8.70	8.40	8.88	....	8.77	8.84	8.63	10.55
Bars, cd. drn. SAE 3100	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23	....	7.12	7.44	6.98	9.55

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions; Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, $3.43. †Los Angeles prices reflect special provisions of Amendment No. 2 to OPA Price Schedule No. 49.

Time is the most critical material!

TIME CAN'T BE BOUGHT BUT IT CAN BE SAVED

Surging through thousands of shops and plants there's an unbeatable determination to win Victory, and win it in shortest possible time. • TIME!—that's the vital element. Even fractions of minutes are precious. Seconds lost by one machine, multiplied by many machines, result in wasted days and weeks—even months. Such time waste is a dangerous enemy at our door. • Consider procedures in production and you'll find that operations revolve around *paper work routines*. In effect, they help to control production, and this control can either *SAVE* time or *WASTE* time. • To *simplify* and *organize* paper work routines . . . to *decrease* non-productive time, *prevent* costly mistakes and *diminish* expensive wastes . . . to *facilitate* accuracy in determining costs . . . these are the functions of Addressograph-Multigraph methods.

***USERS OF OUR PRODUCTS** are entitled to the services of our Methods Department. It can help to extend the use of their equipment in Purchasing, Storeskeeping, Production, Marketing, Shipping, Billing, Collecting, Disbursing and all key operations of business. To those who are interested in up-to-date information on better methods it is available on request, without charge.*

ADDRESSOGRAPH-MULTIGRAPH CORPORATION • *Cleveland* • *Ohio*

(A poster enlargement of above, free of advertising and suitable for bulletin board or framing, will be sent free on request.)

Addressograph-Multigraph Methods **SAVE BRAIN HOURS AND HAND HOURS**

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. on Field grade to and including Dynamo. Pacific ports, add 75c. on all grades.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and Carriage Bolts:

6½ in., shorter and smaller	65½
6 x ⅝ in., and shorter	63½
6 in. by ¾ to 1 in. and shorter	61
1⅛ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
½ in. and smaller	62	
½ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	71 and 10
Stove bolts in packages, with nuts attached	71
Stove bolts in bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland Chicago, Birmingham $3.75

Small Rivets

(7/16 in. and smaller)

Per cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham ..... 65 and 5

Cap and Set Screws

Per cent Off List

Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	68
Milled studs	40
Flat head cap screws, listed sizes	30
Filister head cap, listed sizes	46

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

WIRE PRODUCTS

(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg

Standard wire nails	$2.55
Coated nails	2.55
Cutnails, carloads	3.85

Base per 100 Lb.

Annealed fence wire	$3.05
Annealed galvanized fence wire	3.40

Base Column

Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Hot Rolled	Lap Weld, Hot Rolled
	$	$	$
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)

Base Price—$200 Per Net Ton

Steel (Butt Weld)

	Black	Galv
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as Above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham, $53.80 delivered Chicago, $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle.

FUEL OIL

No. 3, f.o.b. Bayonne, N. J.	5.20c.
No. 6, f.o.b. Bayonne, N. J.	4.285c.
No. 6 Bur. Stds., del'd Chicago	4.75c.
No. 3 distillate del'd Cleveland	6.50c.
No. 4 indus., del'd Cleveland	6.00c.
No. 5 indus. del'd Cleveland	5.25c.
No. 6 indus., del'd Cleveland	5.25c.

Announcing a
26-PAGE CATALOG

★

COVERING
ALL IMPORTANT
SHELL and SHOT
MACHINING OPERATIONS

★

. . . Available on request only to manufacturers of shell or shot or to companies negotiating for such manufacture

★

This catalog contains general information on a series of 32 basic single purpose machine tools engineered for each size and type of shell and shot. The machines described perform all the major machining operations involved in the production of shell and shot within the size range of from 2" to 12" and equivalent metric sizes.

In requesting information, kindly advise type and size of shell or shot and production requirements per hour to enable us to give you specific recommendations.

To conserve time, address inquiries to United States Representatives, Hepburn American Company, Greenwich, Connecticut.

REASONABLE DELIVERIES ARE AVAILABLE

JOHN T. HEPBURN, LIMITED

ENGINEERS AND MACHINE TOOL BUILDERS

TORONTO, CANADA

ADDRESS INQUIRIES TO UNITED STATES REPRESENTATIVES

HEPBURN AMERICAN COMPANY, ENGINEERS

GREENWICH, CONNECTICUT, U.S.A.

TELEPHONES: Greenwich, Connecticut 4843 • Nights and Holidays call Greenwich 4844 • New York, Murray Hill 3-5619

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads).....$135.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk).....$74.50
50% (ton lots, packed)..... 87.00
75% (carload lots, bulk).....135.00
75% (ton lots, packed).....151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)

F.o.b. Jackson, Ohio.....$29.50*
Buffalo 30.75*

For each addition 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorus or over.

*Official OPACS price established June 24.

Bessemer Ferrosilicon

Prices are $1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb., Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon.....13.00c.
2 carbon .....19.50c.
1 carbon .....20.50c.
0.10 carbon .....22.50c.
0.06 carbon .....23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon $113.00*
2.50 carbon 118.00*
2 carbon 123.00*
1 carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload..... $2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V, del'd $2.70 to $2.90†
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots..... $2.25†
Ferrocarbontitanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload, contract, net ton.....$142.50
Ferrocarbontitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload, contract, net ton.....$157.50
Ferrophosphorus, electric or blast furnace material, carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage freight, equaled with Rockdale, Tenn., gross ton..... $58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage, freight equalized with Nashville, gross ton..... $75.00
Ferromolybdenum, per lb. Mo, f.o.b. furnace ..... 95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace..... 80c.
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.... 80c.
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa. 80c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)

Per Gross Ton

Old Range, bessemer, 51.50.....$4.75
Old range, non-bessemer, 51.50. 4.60
Mesaba, bessemer, 51.50..... 4.60
Mesaba, non-bessemer, 51.50.... 4.45
High phosphorus, 51.50..... 4.35

Foreign Ores*

(C.i.f. Philadelphia or Baltimore, Exclusive of Duty)

Per Unit

African, 46-48 Mn.....66.5c. to 68c.
Indian, 48-50 Mn. .....68c. to 70c.
Brazilian, 46-48 Mn.....67c. to 68c.
Cuban, 51 Mn. .....81c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered.....$24 to $26
Tungsten, domestic scheelite, at mine .....$24.00 to $25.00
Chrome ore, lump, c.i.f. Atlantic Seaboard, per gros ton; South African (low grade)..$28.00
Rhodesian, 45 ....Nom.
Rhodesian, 48 .....Nom.

*Importations no longer readily available. Prices shown are nominal.

COKE*

Furnace

Per Net Ton

†Connellsville, prompt $6.00

Foundry

†Connellsville, prompt..$6.75 to $7.00

*Maximum by-product coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. Maximum beehive furnace coke prices established by OPA, Jan. 26. †F.O.B. oven.

By-product, Chicago $12.25
By-product, New England.....$13.75
By-product, Newark..$12.40 to $12.95
By-product, Philadelphia $12.38
By-product, Cleveland $12.30
By-product, Cincinnati $11.75
By-product, Birmingham .....$8.50†
By-product, St. Louis $12.02
By-product, Buffalo $12.50

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton.....$40.00
Angle bars, 100 lb..... 2.70

(F.o.b. Basing Points) Per Gross Ton

Light rails (from billets).....$40.00
Light rails (from rail steel)... 39.00

Base per Lb.

Cut spikes ..... 3.00c.
Screw spikes ..... 5.15c.
Tie plates, steel ..... 2.15c.
Tie plates, Pacific Coast..... 2.30c.
Track bolts ..... 4.75c.
Track bolts, heat treated, to railroads ..... 5.00c.
Track bolts, jobbers discount.. 63-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR

Fire Clay Brick *Per Net Ton*

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail $25.00
Domestic, f.o.b. Ohio River landing barges 25.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines 25.00
Foreign, 85% calcium fluoride, not over 5% Si, c.i.f. Atlantic ports, duty paid.....Nominal
Domestic No. 1 ground bulk, 95 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines....$34.00
As above, in bags, f.o.b. same mines 36.40

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick *Per 1000*

Super-duty brick, St. Louis...$64.60
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 51.30
First quality, New Jersey..... 56.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 46.55
Second quality, New Jersey... 51.00
No. 1, Ohio..... 43.00
Ground fire clay, net ton..... 7.60

Silica Brick

Pennsylvania $51.30
Chicago District 58.90
Birmingham 51.30
Silica cement, net ton (Eastern) 9.00

Chrome Brick *Per Net Ton*

Standard, f.o.b. Baltimore, Plymouth Meeting and Chester...$54.00
Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester, Pa. 54.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester $76.00
Chemically bonded, f.o.b. Baltimore 65.00

Grain Magnesite

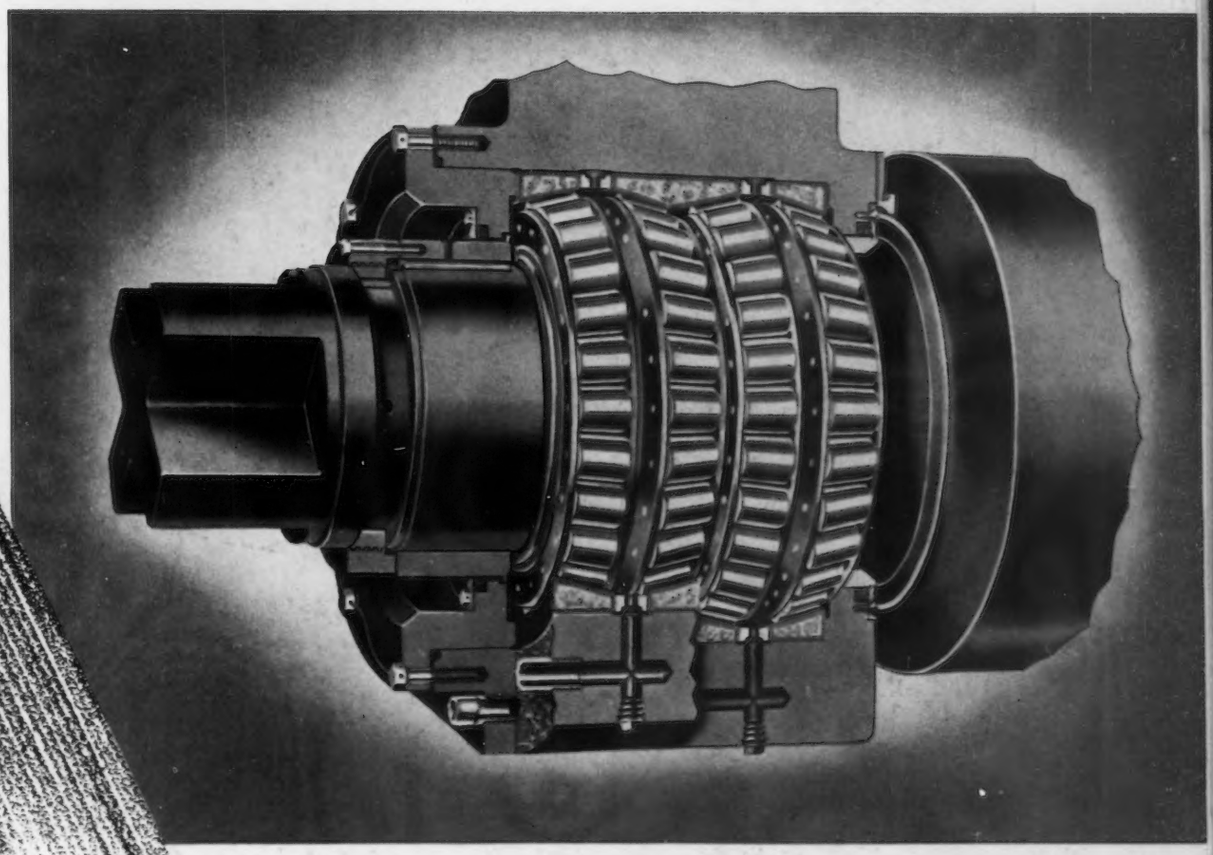
Domestic, f.o.b. Baltimore and Chester in sacks (carloads)..$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk) 22.00

East Engin. Library

AY 21, 1942

MAY 22 1942

The IRON AGE



Timken 4-row Roll Neck Bearing.

More and more steel for the tools of Victory from Timken Bearing Equipped mills

"Keep 'em Rolling" applies to steel mills as vitally as it does to the tanks, trucks, armored cars, etc., manufactured from the steel the mills produce. Timken Tapered Roller Bearings are important factors of speed and endurance in both instances.

The productive time of mills equipped with Timken Roll Neck Bearings is greater because involuntary stoppages are fewer; precision is higher; scrap is lower.

When mills—new or old—are equipped with Timken Bearings the results are certain, for Timken Roll Neck Bearings went through the experimental stage many years ago.

Bring your existing plain bearing mills in line with modern performance standards—put them on Timken Bearings. Consult the mill builder or Timken engineers.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

VICTORY STATES BONDS

No Need for "CONVERSION"

These Hoskins electric furnaces were bought for an important peace-time use. Today, these very same furnaces are batting away on war work. On some glad tomorrow, they will again be used in helping to build better automobiles. . . . Thus, Hoskins electric furnaces are versatile in their fields of application. They are made in several sizes and are so staunchly built they provide round-the-clock production.

Their Chromel units are hard to wear out, and easy to renew. The furnaces turn out good work, with no guess work. Results are duplicated, heat after heat. Their silent operation is an asset, too. For heat-treat production that is sustained and good, ask for Catalog 58. (If you need heat-resisting castings, ask about our Alloy-502.) Hoskins Manufacturing Company, Detroit, Michigan.

HOSKINS PRODUCTS

ELECTRIC HEAT TREATING FURNACES • • HEATING ELEMENT ALLOYS • • THERMOCOUPLE AND LEAD WIRE • • PYROMETERS • • WELDING WIRE • • HEAT RESISTANT CASTINGS • • ENAMELING FIXTURES • • SPARK PLUG ELECTRODE WIRE • • SPECIAL ALLOYS OF NICKEL • • PROTECTION TUBES

HEATING ELEMENT WIRE
Chromel
NICKEL-CHROMIUM

THE IRON AGE, published every Thursday by the *CHILTON CO. (INC.)*. Entered as second class matter November 8, 1932, at the Post Office at Philadelphia under act of March 3, 1879. $8 yearly in North America and South America, Foreign $15. Vol. 149, No. 21.

MAY 21, 1942
VOL. 149, NO. 21

J. H. VAN DEVENTER
President and Editor
C. S. BAUR
Vice-President and General Manager

o o o

Managing Editor, T. W. LIPPERT
News & Markets Editor, J. A. ROWAN
Technical Editor, F. J. OLIVER

Associate Editors
D. R. JAMES T. E. LLOYD
Art Editor, F. J. WINTERS

Editorial Assistants
M. M. SCHIEN G. B. WILLIAMS
J. I. BUTZNER S. H. BARMASEL

Washington Editor
L. W. MOFFETT

Resident District Editors
T. C. CAMPBELL, Pittsburgh
W. A. PHAIR, Chicago
B. W. CORRADO, Cleveland
W. F. SHERMAN, Detroit
CHARLES POST, San Francisco

Editorial Correspondents
W. P. DEARING, Buffalo
ROBERT G. McINTOSH, Cincinnati
G. FRAZAR, Boston
R. RAYMOND KAY, Los Angeles
HUGH SHARP, Milwaukee
JOHN C. McCUNE, Birmingham
F. SANDERSON, Toronto, Ontario
ROY M. EDMONDS, St. Louis
C. H. BACON, Seattle

o o o

A. H. DIX, Manager Reader Service

o o o

Advertising Staff
Emerson Findley, Robert F. Blair } 621 Union Bldg., Cleveland
B. L. Herman, Chilton Bldg., Philadelphia
H. K. Hottenstein, 1012 Otis Bldg., Chicago
R. Raymond Kay, 2420 Cheremoya Ave., Los Angeles, Cal.
H. E. Leonard, 100 East 42nd St., New York
Peirce Lewis, 7310 Woodward Ave., Detroit
C. H. Ober, 100 East 42nd St., New York
W. B. Robinson, W. J. Fitzgerald } 428 Park Bldg., Pittsburgh
D. C. Warren, P. O. Box 81, Hartford, Conn.
O. L. Johnson, Market Research Mgr.
B. H. Hayes, Production Manager.
R. E. Baur, Typography and Layout.

o o o

Member, Audit Bureau of Circulation
Member, Associated Business Papers
Indexed in the Industrial Arts Index. Published every Thursday. Subscription Price North America, South America and U. S. Possessions, $8; Foreign, $15 a year.
Single copy, 35 cents.
Cable Address "Ironage N. Y."

o o o

Owned and Published by
CHILTON COMPANY
(Incorporated)

Executive Offices	Editorial and Advertising Offices
Chestnut and 56th Sts.	100 East 42nd St.
Philadelphia, Pa.	New York, N. Y.
U.S.A.	U.S.A.

OFFICERS AND DIRECTORS
C. A. MUSSELMAN, *President*
JOS. S. HILDRETH, Vice-President
GEORGE H. GRIFFITHS, Vice-President
EVERIT B. TERHUNE, Vice-President
J. H. VAN DEVENTER, Vice-President
C. S. BAUR, Vice-President
WILLIAM A. BARBER, Treasurer
JOHN BLAIR MOFFETT, Secretary
JULIAN CHASE, THOMAS L. KANE,
G. C. BUZBY, P. M. FAHRENDORF,
HARRY V. DUFFY CHARLES J. HEALE

This Week in . . .

THE IRON AGE

Editorial

History Repeats 37

Technical Articles

A New Conception in Tool Grinding 39
Manufacture of High Test Cast Iron Crankshafts 42
Heat Treating Aluminum Aircraft Parts 47
Spraying of Metal 50
Cartridge Brass Hardness Conversion Table 55
Welded Tube with Flattened Ends 56
Gear Manufacturers Meet 60
New Equipment: Plant Service Apparatus 63

Features

Assembly Line 66
Washington 70
West Coast 74
Fatigue Cracks 78
Dear Editor 80

News and Markets

This Industrial Week 82
News of Industry 85
Personals and Obituaries 120
Non-Ferrous Metals 123
Machine Tool Activity 124
Scrap Markets 126
Iron and Steel Scrap Prices 128
Comparison of Prices 129
Finished Steel Prices 130
Warehouse Prices 132

o o o

Products Advertised 164
Index to Advertiser 205

Copyright, 1942, by Chilton Company (Inc.)

ABC ABP

* Ryertex is made from a specially-developed textile material impregnated with synthetic resin and permanently molded under intense heat and tremendous pressure, producing a dense, strong, hard-surfaced bearing that has proven capable of withstanding very heavy continuous loads. It is manufactured exclusively for Joseph T. Ryerson & Son, Inc., by the Continental Diamond Fibre Co.

Ryertex* *Non-Metallic* Bearings Now Replace Babbitt and Bronze

Save Strategic Metals — Easy to Install

Switch your machines to Ryertex Composition Bearings and forget bearing worries for the duration . . . and *after!*

It's *easier* to get Ryertex. *Smart engineering* to use this better bearing material. And *common sense* to avoid draining scarce stocks of brass, babbitt and bronze now that Ryertex is available. That's why many industries are quickly changing to this superior, non-metallic bearing.

Fortunately, Ryertex won its spurs as a superior bearing material years ago. Now, proof-tested and with enviable performance records, Ryertex is ready to go to work for you.

Ease of installation and very moderate cost are only *two* reasons why you should consider Ryertex. Challenging all production and maintenance engineers are these additional reasons.

Ryertex has a lower frictional coefficient than bronze or babbitt....

.....can carry greater loads—
.....is longer wearing—
.....harder (Scleroscope Test)—
.....corrosion resistant—
.....lighter—
.....uses oil, grease or water lubrication—
.....conserves hard-to-get metals—
.....saves power, downtime, and results in a better product.

Send us your inquiry and specifications for prompt action.

Joseph T. Ryerson & Son, Inc., Chicago, Jersey City.

PHYSICAL PROPERTIES

Specific Gravity	1.37
Weight per Cu. In. Oz.	0.8
Modulus of Elasticity, psi	1,500,000
Tensile Strength with grain, psi	9,400
Tensile Strength across grain, psi	7,000
Compressive Strength, Flat, psi	37,500
Compressive Strength, Edge, psi	25,000
Bending Strength, psi	18,000
Water Absorption in 100 hrs.	1.07%
Scleroscope Hardness	75
Max. Operating Temp. Deg. F.	275
Thermal Coeff. Expansion	30 x 10^{-6}
Dry Coeff. of Friction	0.280
Permanent Set per 1" thickness under load of 1000 psi	.002

RYERTEX *non-Metallic* BEARINGS

THE IRON AGE

MAY 21, 1942

ESTABLISHED 1855

History Repeats

ONCE upon a time, many centuries ago, the Maharajah of Swat of ancient India was faced with the problem of defending himself from an unfriendly, neighboring potentate. This was in the days when there was as yet no British Empire and when India consisted of several hundred non-integrated and unfriendly kingdoms, each ready to leap at its neighbor's throat at the drop of a turban.

Defense naturally called for the erection of fortifications and barricades, and this being prior to the Iron Age and in fact being the Wooden Age, the Maharajah of Swat summoned his labor gang and bade them chop down with their stone axes several thousand of the largest trees in the forest.

Once the trees were chopped down, the problem changed to that of transporting them to the defense lines and erecting the fortifications. At this point in the proceedings, it became necessary to call upon the elephants since mere manpower was inadequate to carry and handle these huge logs.

So the Maharajah summoned the keeper of the elephants and told him to get busy.

The elephants patiently and uncomplainingly undertook their work as elephants have a habit of doing when there is work to be done. They lifted the huge logs in their trunks and stumbled laboriously through the jungles with their loads. It was arduous work since the logs were so large that the elephants could not see clearly where they were going and had to feel their way cautiously with their feet.

The elephants were doing right well in carrying out the orders of the Maharajah, under the direction of their accustomed mahouts or managers. But it was not many moons before the grand vizier and the sun vizier and the assorted caliphs and catiffs who composed the royal retinue developed scarabs in their pajamas, which in the modern equivalent is "ants in their pants."

So they met in council and the grand vizier said: "This job is going too smoothly without our participation and we are therefore being shown up as unnecessary appendages to the body politic. Something must be done about it to impress the Maharajah and the public with our essentialness."

So they journeyed far and wide and returned with all manner of eggs, large and small, that could be found in the kingdom. These they proceeded to strew in the paths of the elephants after passing a law that any laboring elephant who stepped on an egg should be smitten in the rear with a sharp spear.

Now the unfortunate elephants, laden as they were, could not help but inadvertently step upon an egg occasionally, whereupon the caliphs and the catiffs, together with their swamis and salamis, found pleasant occupation which brought them into the scheme of things and also entertained the public.

Legend sayeth not which side won the war, nor which side suffered the greatest casualties. As to the latter, we think it was the backsides of the elephants.

J. H. Vanderventer

These Plants Can Take on More War Work

They Have Men and Machines Available for Immediate Production

Numerous plants throughout the Middle West are listing their available facilities for war work with Inland Steel Co.

Brief summaries of these facilities are listed below to help bring manufacturers in contact with "prime" contractors or Government agencies—thus speeding all-out war production.

Write or wire Inland for names and addresses of any of the following plants. Because our list of available war work plant capacity is growing daily, we suggest that you get in touch with us even if the types of plant and equipment you require are not listed.

IS-39 Iowa oil heating equipment mfr., fl. sp. 40,000 sq. ft. Has nearly 100 experienced emp., all available for war work contracts. Equip. includes sheet metal and welding dept., stamping, forming, rolling, rough machine work, casting, grinding, polishing, structural iron formation, pressure vessels, tanks, etc.

IS-40 Wis. mfr. of stampings and metal specialties. Has 31,000 sq. ft. of mfg. sp. with 75 emp. working 8 hr. a day. Desires prime and subcontract stamping work. Equip. includes 36 punch presses (incline and vertical), double end disc grinders, degreasers, spot welders, riveting mach., plating dept., spray booths, gas fired baking ovens, squaring shears, and power press brakes.

IS-41 Ohio sheet and plate fabricating shop specializing in redesigning machine bases and construction equip. to shear, form, weld, torch cut, punch, notch, grind, finish and assemble steel bars, plates, sheets 16 ga. ½". Company long established, very well equipped and staffed to handle any type or quantity of specialized steel fabrication.

IS-42 Thirty-four-year-old metal office furniture mfr. (Mich.) with a complete line of shears, presses, spot and arc welders, and finishing room equip. Now working one shift 30% war work, has 120,000 sq. ft. of fl. sp. with plenty of labor available. Excellent shipping facilities.

IS-43 Ill. sheet steel fabricating plant, cap. 16 ga. to ¼", emp. 150 men, seeks highly rated sub-contract work. Facilities for shearing, forming, pressing, and welding. Press brakes to ¼" x 4'—0" to 27'—0" lg., presses from 5 to 500 t., hot dip gal. kettles 24'—0" lg.

IS-44 Iowa agricultural and hardware specialties mfr. has complete equip. for stamping, drawing, forming, and assembling of sheet metal products. Modern plant including 10' cap. squaring and circular shears, punch presses, press brakes, air riveters, spot, arc, and butt welders, also dip or spray lacquers, air drying finishes, special tank dept., fabricating 16 ga. and lighter. Doing some Government work now.

IS-45 Minn. machine shop and grey iron fdry. emp. 120 has 2½ acres fl. sp. including several modern planers, 3 new high-speed turret lathes, a 48" double head boring mill, a 20 ft. bed engine lathe, gear cutters, drills, forging and welding shop include 2 steam hammers and 2 cast iron heat treating furnaces.

IS-46 Largest fabricator of steel plate in upper Miss. Valley has available cap. on two four-column, 300-ton hyd. presses for bending, flanging and forming.

IS-47 Well equipped sheet metal mfg. plant (Minn.) with 2—12' long, 2—10' long, 1—7' and 1—4' power press brakes with 150—10' and 12' long dies for same. Shears and rolls, drop presses, punch presses, stake riveters, electric arc and spot welders, complete blacksmith and tool shop, all in first-class condition to produce sheet metal products 30 ga. to 10 ga. incl. Large well equipped hot-dip gal. plant in connection.

IS-48 Large Wis. mfr. of enameled, stainless and cast iron steel ware, and special metal fabrication, desires sub-contract war work on following equip.: 10 double geared toggled draw presses, 2 geared double crank presses, 2 single geared toggle draw presses (fl. sp. 17,000 sq. ft.), trim bead and spinning dept. includes 54 different kinds of lathes, oval trimming bead, spin lathes, large, small and automatic (fl. sp. over 17,000 sq. ft.). 26 various punch presses including horning and wiring and inclinable power (fl. sp. 10,000 sq. ft.), 25 gas and 2 percussion welders, also spot welders, polishing lathes, and complete tool maintenance and pattern dept., cleaning and pickling, enameling and burning.

Dedicated to Victory

INLAND STEEL CO.

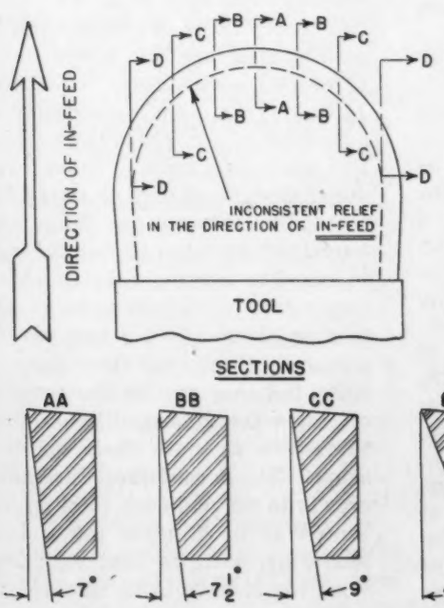
38 S. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City, Cincinnati, New York

A New Conception in Tool Grinding

o o o

FOR the first time perhaps since the days of Frederick W. Taylor, a radically new theory of tool shapes has been advanced and a method developed for obtaining this tool shape economically in practice. In the main, the principles governing tool performance established by Taylor after 26 years of experimental work, which is summed up in his monumental paper "On the Art of Cutting Metals" presented in 1906 before the American Society of Mechanical Engineers, still holds good today. In fact, the tool forms developed by him are basic to all modern forms of cutting tools as was pointed out in the recent article on "Control of Tool Shapes," by Jonathan C. Hinton, which appeared in the Dec. 18, 1941, issue of THE IRON AGE.

The new conception is the principle that, for uniform life over the entire cutting edge of the tool, the tool should be provided with constant relief in the direction of feed. A new type of tool grinder has been developed which fulfills this condition and introduces a number of secondary factors that contribute toward longer tool life. These secondary factors include means of precise control in grinding tool angles, close control of the amount of material removed in regrinding so as to prolong overall tool life, precise reproduction of form tools within close dimensional limits and the production of fine surface finish so as to lengthen life between grinds and produce a clean cut. With angles controlled within minutes of arc rather than degrees, it is necessary on certain applications like cutting hard materials for which relief angles are normally small, to take into account the lead angle or helix produced by the feed of the tool either radially or longitudinally. This lead angle is the angle whose tangent is the feed per revolution divided by the



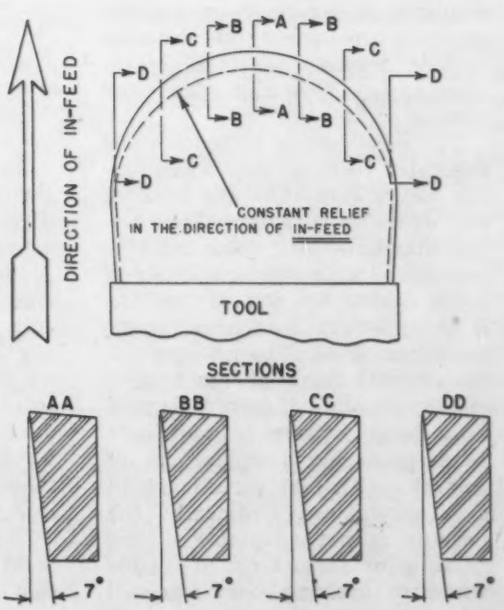
LEFT

FIG. 1—A nose tool ground in the conventional manner with uniform relief (measured radially) around the periphery of the cutting edge has variable or excess relief in the direction of in-feed as indicated by the parallel sections taken at AA, BB, CC and DD.

o o o

RIGHT

FIG. 2—Although the angle of relief measured radially is constantly varying in this nose tool ground on a Bura-Way grinder, in the direction of in-feed the relief angle is constant at 7 deg.



circumference of the work piece.

This combination of a new scientific method and a machine to generate, reproduce and maintain precision cutting tools is named the Bura-Way. It takes its title from the inventor, Walter M. Bura, who conceived the idea of grinding in one operation the profile of a tool irrespective of the number of radii involved and at the same time attain constant relief in the direction of feed. Mr. Bura is associated with the firm of James Donaldson Co., Inc., 230 Park Avenue, New York, which is developing and marketing the Bura-Way grinder.

While the unit is primarily designed for precise grinding of high speed and cast-chromium cobalt cutting metals, it is equally suitable for the grinding of cemented carbide tipped tools. In fact, the machine carries to a further degree all the refinements that have been available in recent years for the grinding and lapping of cemented carbide tipped tools and makes them applicable to high speed steel tools as well.

The new system is particularly adaptable to mass production setups where long runs are involved and where it pays to develop certain standard tools which must be reproduced accurately a number of times during the life of the job. It is applicable to convex, single point form tools. The job on which the original machine was applied was the grinding of form tools used on a large battery of automatic lathes producing a single type of product (with size variations) in large quantities. Ordinarily, the machine is not adaptable to the grinding of form tools of double curvature involving concave as well as convex forms since all grinding is done on the face of the wheel, which is trued straight across. The method can be applied to general purpose lathe, planer, shaper and boring tools. The form of each tool is governed by a cam which in turn must be generated from a master tool.

Among the principal claims made for the Bura-Way grinder are:

(a) Overall tool life is increased 1000 percent or more

(b) Tools can be ground exactly alike in any number and maintained exactly alike within 0.0005 in. of shape and size and within a few minutes of angle by an unskilled operator

(c) Speeds retooling and regrinding and reduces overall down time, since tools are changed less frequently

(e) Cuts tool costs to a marked degree and conserves scarce high speed steel

(f) Provides effective means of salvaging tools

(g) Decreases spoilage in work pieces.

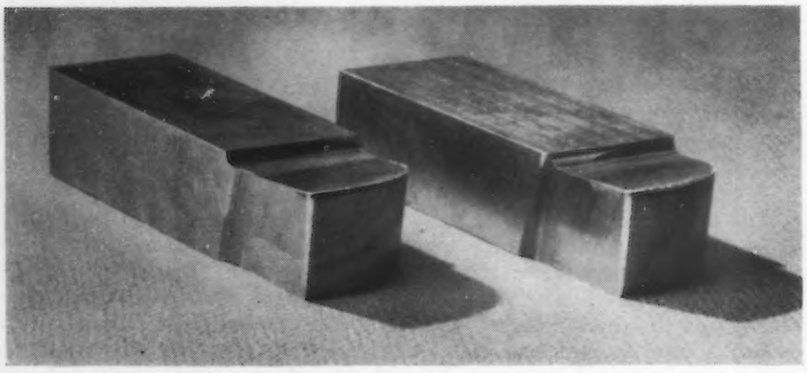


FIG. 3—Two rough forming tools after being used on an automatic lathe for 14 hr. (left) and 17 hr. (right). Because these tools were ground with constant relief in the direction of feed, the wear is practically uniform around the entire cutting edge.

To best explain what is meant by the term "constant relief in the direction of feed," let us look at a conventional round nose tool, Fig. 1, which has a 7 deg. relief or clearance angle under the cutting edge at all points measured radially, or normal to the surface. If we examine sections taken at *AA*, *BB*, *CC* and *DD*, however, in planes parallel to the direction of infeed, we find that the relief angles in these planes increase from 7 deg. at *AA* to 7½ deg. at *BB*, 9 deg. at *CC* and 22 deg. at *DD*. If we "integrate" the tool into a series of thin slices stacked together, we find tool sections at *DD* and beyond with practically no support to the cutting edge. In fact at the point of tangency with the straight portion of the tool, this relief angle in the direction of feed approaches 90 deg. or zero support, which explains why infeed form tools often fail at this portion of the form where the cutting load would appear to be lightest. It stands to reason that, if a tool section has a life of 8 hr. at *AA*, it may easily have a life of only 2 hr. or less at *DD*.

It can be seen at Fig. 2 how constant relief is obtained in the direction of feed by grinding a variable relief measured radially to the tool form. Ground on the Bura-Way grinder, this tool, like the one shown in Fig. 1, has a front clearance angle of 7 deg. but a nominal clearance at the sides of only about 1½ to 2 deg.—just enough to avoid frictional drag on the work as the tool enters the cut. If, however, sections are taken through the face of the tools at *AA*, *BB*, *CC* and *DD* in the direction of infeed, we find that the relief angle of these planes remains constant at 7 deg. Thus, if we integrate this tool into a series of thin slices stacked together as before, we find that each has the same front relief and hence the same support of the cutting edge and the same tool life at each point.

Cutting edges break down at their weakest points. Tools ground with constant relief have no weak point theoretically, and therefore wear evenly at all points on the cutting edge until the maximum of efficiency has been obtained. That this theory holds in practice can be seen by studying Fig. 3, which pictures two radius form tools after 14 and 17 hr. runs respectively in automatic lathes. These tools, which are made of Circle C super high speed steel, were used to rough out the radius between the flange and barrel of an aircraft engine cylinder. The material cut was a steel forging of nitriding quality containing about 3½ per cent nickel. Obviously these tools show signs of wear, but they require the removal of only a few thousandths of stock to restore them to their original shape. The normal procedure however is to regrind such tools on the Bura-Way machine at the end of each 8-hr. shift so that even less stock would have to be removed at

each regrind. Thus an average of 35 to 40 regrinds are possible before the tool head has reached its maximum life as determined by the depth of the point, for it should be realized that the top rake is reground each time and this action gradually reduces the stock under the cutting edge. The worn tool head is then cut off and a new one ground. This practice is continued until the tool bar becomes too short for use. Ordinarily in free hand grinding of tools, much more metal is removed at each sharpening so that after four or five regrinds the tool life is ended, particularly if tool failure has been allowed to progress to the point where considerable stock must be removed to clear up chipped edges and the like. Fig. 3 also shows the fine surface finish to be obtained in this machine, which gives a surface roughness of not more than 3-4 micro-in.

Machine Details

In the Bura-Way grinder refinements of angular control have been carried much further than on a high-grade carbide tool grinder. Instead of using a protractor, for example, angular settings are made by the sine bar principle using gage blocks precise to hundred thousandths of an inch. In this way, angular settings can be reproduced within a matter of a few minutes of arc instead of within half of a degree as on a protractor setting.

As in most carbide grinders, grinding is done on the face of the wheel rather than on the periphery so that the relief angles are not distorted by the influence of wheel curvature. Furthermore, for precise control of angles and dimensions and to prevent burning the tools, spindle float is eliminated by a preloaded ball bearing mounting and wheel overhang is kept at a minimum. A precision pivot mounting is also provided for the hand operated diamond dresser which is swung down across the face of the wheel. Periodical dressing of the wheel automatically compensates for wheel wear.

The tool itself is mounted in a heavy, but freely moving tool holder which can be slid by hand upon the smooth surface of a pivoted table at the front of the wheel. Actual control of tool shape is by means of a cam plate which is attached to this tool holder and which is rolled, during the grinding operation, against a straight depth control bar parallel to the wheel face. The cam itself is made on the same machine by means of an auxiliary table attachment which raises the cam plate to a position above the centerline of the wheel. When grinding the cam plate in this machine, a master form tool, ground by hand, is rocked against a flat stop plate mounted above the diamond dressing attachment in the same manner as the cam is later rolled against the depth control bar.

A tool set gage positioned at the side of the table governs the setting of the tool when it is placed in the holder as regards the depth of feed into the wheel. The cam itself is

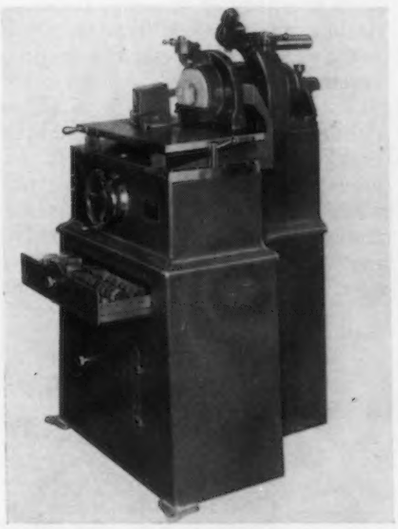


FIG. 4—In the Bura-Way grinder, the tool is mounted in a holder which is free to move on a flat table which can be adjusted to precise angles by a sine bar arrangement. The amount of metal removed in one grinding and the shape of the tool generated is controlled by the cam plate screwed to the bottom of the holder. This cam plate is rolled against a horizontal depth control bar beneath the wheel. At the right of the wheel guard may be seen the setting gage stops for the cam plate and the tool.

set back from its stop a few thousandths by feeler gage while the tool is set directly up against its stop. The distance between these two stop planes incidentally is equal to the distance between the plane in which the diamond dressing wheel is swung and the parallel depth control bar located below and behind the wheel.

To obtain the blending of relief angles and constant relief in the direction of feed, the machine makes use of two accurate angular settings. The large table is tilted downward to the minimum clearance or relief needed on the side of the tool. By means of another sine bar arrangement, the tool in its holder is tilted in a vertical plane about a horizontal axis to the amount of front relief less side relief.

Then if a relief angle of 7 deg. for example is desired at the front of the tool for infeed and 2 deg. clearance at the side, the tool holder is set precisely at -5 deg. and the table at -2 deg. When presented at right angles to the wheel face, a 7-deg. relief angle is produced. When the tool holder is swung around so as to present the side of the tool to the wheel, a 2-deg. relief angle is obtained. By rocking the cam by a rolling motion along the depth control bar, a perfect blending of these two angles is obtained.

When grinding top and side rake angles, an auxiliary raising block is employed which is located by dowel pins on the table. A key in the side of the tool block holder engages a slot in the raising block parallel to the wheel face and permits the tool to be traversed by hand across the wheel in the plane of the wheel face. The table is set at a plus angle corresponding to the desired top side rake or is held horizontal if no side rake is desired, and the tool itself is set at a negative angle in the holder corresponding to the desired back top rake. Feed of the work is effected by the handwheel which advances the table and tool into the wheel.

Wheels are interchanged for rough and finished grinding. Ordinarily the work is done dry but in the case of carbide tools, a lubricating unit is used.

The Bura-Way grinder opens up new possibilities in tool room procedure that can establish new standards of accuracy and new and important economies in tool maintenance. It is a type of machine that makes centralized tool crib control a necessity. It brings the control of tool angles back into the hands of tool supervisors and production engineers instead of leaving this important element in the overall production picture in the hands of individual machine operators whose training these days is all too brief. Much can be gained in machine tool output by making cutting tools more effective in their performance.

Manufacture of

High Test Cast Iron C

THE shortage of steel, coupled with the difficulty of obtaining forgings today has made the substitution of cast iron for forged steel crankshafts a matter for urgent study. It is perhaps unfortunate that the trend of opinion among engineers is conservative towards the idea of adopting a cast material for a highly stressed component, and the development of the process of substitution has been retarded because of the feeling that further extensive tests are required, despite the proved scientific and technical data available.

The authors are of the opinion that the foundry aspect of this study should have prime consideration because experience has indicated that such failures with cast crankshafts as have occurred, have been due largely to some factor of design which could not or would not be modified to suit the foundry recommendation.

To expect a cast shaft to follow rigidly the design of a forged steel crankshaft is unfair, and is obviously unsound practice; and while the authors agree it is sometimes impossible to modify existing engine dimensions to suit a cast shaft, they are of the opinion that such things as balance weights, fillets and web shapes can often be modified with advantage to suit foundry requirements.

Extensive research has been and is now being carried out to ascertain the suitability of the modern high test cast irons as materials for use in crankshafts, and the results show that these irons have certain physical properties which make them even more suitable than steel. All these results, however, go by the board unless the fundamental principle of getting a sound casting is kept first and foremost in the designer's mind. Test bar

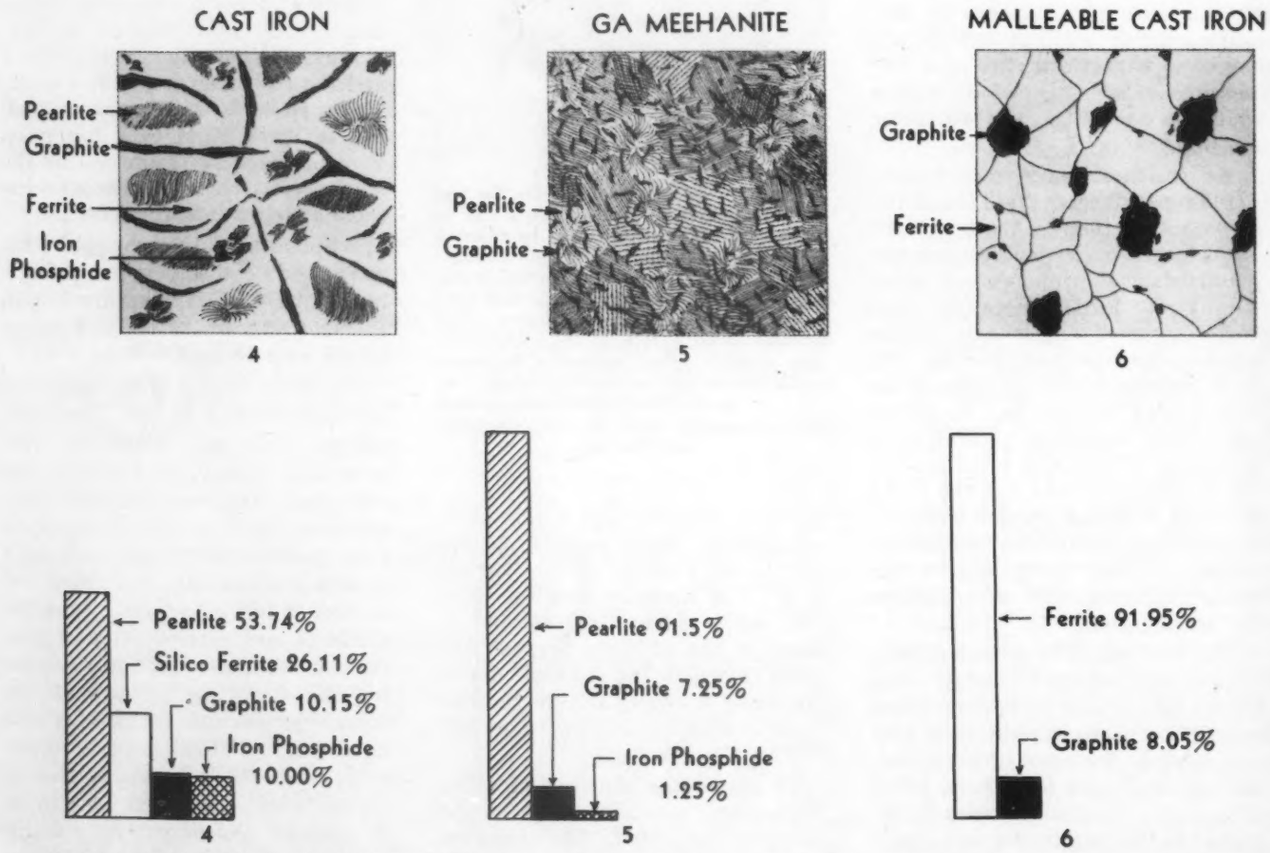


FIG. 1—Graphic representations of the composition and structure of various irons. The proportion of each constituent is shown by volume.

n Crankshafts . . .

By E. M. CURRIE
and
R. B. TEMPLETON
International Meehanite Research Institute, London, England

. . . High test cast iron may successfully be used to replace forged steel in crankshaft production, and, according to the authors, the cast shafts possess several points of superiority.

results which show very high tensile strengths are often misleading because as higher strengths are obtained, the difficulties of the casting process increase. A perfectly sound casting made in an iron of 56,000 lb. per sq in. tensile strength is infinitely better than one not quite so sound made in an iron of 67,200 lb. per sq. in. tensile, and if this vital aspect is not overlooked or ignored then successful results can be achieved.

Foundry Practice Revolutionized

As in all branches of engineering, the iron foundry industry has had to keep pace with intensive scientific progress, and it might be said with confidence that the technique of this particular industry has been revolutionized during the past 10 to 15 years.

In the iron foundries where high test irons are being made, this progress has perhaps been more remarkable than it has been in those foundries which do not have to comply with the higher specifications now in use. The development of the modern high test irons has, by precise metallurgical control, produced a dependable and consistent engineering material which can cover a wide range of applications and physical properties.

Possibly the most outstanding instance is the production of cast iron crankshafts. Before the era of the internal combustion engine some of the earliest crankshafts were made in cast and wrought irons, but with the development of steel with its higher strengths and ductility, engineers turned away from cast iron, and its possibilities and properties were in many cases forgotten.

It will readily be appreciated that the casting process is primarily suitable for the medium and small crankshaft with offset throws and integral balance weights. An American diesel engine is being built with a 10-in. diameter crankshaft which is more than 12 ft. long. This shaft will be cast in Meehanite metal.

Advantages of Cast Shafts

Shafts may easily be lightened by coring out to eliminate unnecessary weight; less material is used for the same size crankshaft when cast as compared with a forging. A casting also has better wear resistance, high fatigue and damping properties combined with rigidity, and reduced resonance and gives smoother running. These factors are leading to the rapid adoption of cast iron for this purpose.

Expensive dies, forging and heat treating equipment are not necessary for castings. Machining costs are considerably reduced; not only can a cast-iron crankshaft be machined more quickly than high alloy or normal steels, but a considerable saving in material is made. Frequently, forged crankshafts may have as much as 50 to 80 per cent material to be removed in maching, whereas a casting made to normal limits can be regularly produced having no more than 5 to 10 per cent metal to be removed.

The cost of wood or metal patterns is only a fraction of forging dies so new and experimental shaft designs can be made and tried out cheaply and alterations made quickly. The production of the cast iron shaft by machine mold-

FIG. 2—Microstructure of the type of Meehanite used in crankshaft castings.

FIG. 3—Two stages in crankshaft casting. The workman above is cutting runners and risers into the mold. A hammer and cold chisel, below, are used to dress the casting after shakeout.

o o o

ing methods is far speedier than forging practice.

Material and Physical Properties

The properties of cast iron of importance to crankshaft designers are: Tensile, fatigue and torsion strengths; notch sensitivity, damping capacity and wear resistance.

The authors have for some considerable time had exceptional opportunities for studying and furthering the development of cast crankshafts in the high test cast iron known as Meehanite metal. Meehanite is a cupola melted iron, made under controlled furnace conditions. It would normally solidify as a white iron, but by interference with normal graphitization by ladle processing, it solidifies with a definite sorbo-pearlitic-graphitic structure. A typical analysis is: C, 2.75 per cent; Si, 1.59 per cent; Mn, 0.88 per cent; S, 0.073 per cent; P, 0.076 percent, and Mo, 0.29 per cent.

It will be appreciated that if, therefore, Meehanite metal is given undue prominence in what follows, this is not intended as a reflection on many other processed and alloy high test irons used for crankshafts, camshafts, etc., but is merely a record of the authors own experiences.

The fundamental basis of the production of high strength cast irons today does not wholly depend on chemical analysis or on the addition of this or that alloy. Rather does it depend on the production of a proper structure and arrangement of the main constituents of cast iron, namely graphite, pearlite, and phosphide eutectic, with a minimum of free ferrite, cementite and minor inclusions such as manganese sulphide, together with a control of the rate of graphite distribution on the cooling down of the metal to the solid state.

The structure aimed at for Meehanite cast crankshaft material is produced by a control of the quantity of total carbon together with processing to give the proper balance between the combined and graphitic carbon contents in a matrix of fine sorbopearlite. Superheating and precise control over the melting furnace refines the graphite and grain structure, and final processing of the molten metal in the ladle produces the structure which is known to have the highest physical results required for a specific purpose.

The graphical representation of structures and compositions shown in Fig. 1 makes this clear, and in Fig. 2 is shown as photomicrograph of the actual structure of the type of Meehanite used for cast crankshafts.

Meehanite irons produced in this manner have tensile strengths as cast ranging from 56,000 to 71,600 lb. per sq. in., and after simple heat treatment are capable of giving 78,500 to 100,800 lb. per sq. in. Specially processed Meehanites have given as much as 112,000 lb. per sq. in. tensile after heat treatment.

Foundry Technique

The essential problems of the founder in making cast crankshafts may be summarized as follows:

(1) To produce a material reg-

ularly and consistently with physical properties which will withstand fatigue stresses involving bending, torsion and a combination of bending and torsion stresses, also with consistent values of strength, hardness and impact properties, etc., etc.

(2) To correlate these properties to the section and design so that the optimum characteristics of these properties are obtained in the crankshaft.

(3) Alternatively, to ensure that, if necessary, design is modified to suit conditions of cooling and the casting possibilities of the particular design.

(4) To produce castings economically which will be free from internal porosity and surface blemish.

Item (1) has been dealt with under "Material and Physical Properties," and is partly a matter of proper shaft design. Further comment is necessary, however, to emphasize the necessity of strict supervision over all incoming raw materials; the correct weighing of all cupola charges including coke, limestone, etc.; the correct positioning of these charges in the cupola, and the maintenance of the coke bed charge and any subsequent buffer coke charges. Allowances must be made for daily barometrical changes and the closest supervision must be exercised over the molten metal and its transfer at correct temperature to the molds.

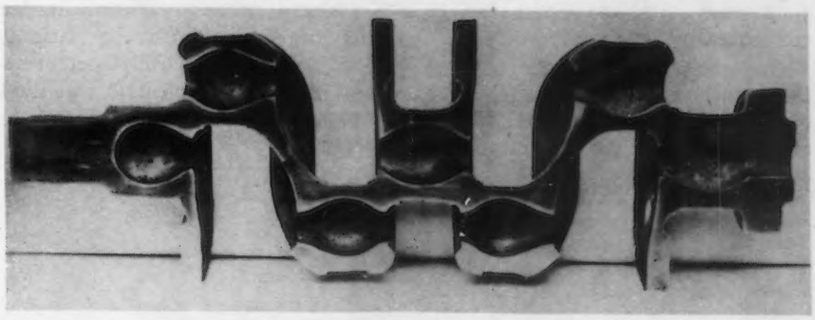


FIG. 5—Sectional view of a cored shaft, showing the manner in which weight has been eliminated.

When molten cast iron or cast steel is poured into a mold, it immediately begins to cool down towards the solid state, and the state of the mold receiving the hot metal is highly important. All crankshafts should be made in dried sand to assist the metal in filling the mold with as little further loss in temperature as possible. Dried sand molds offer better resistance to the erosion effects of the metal and reduce sand wash with its resultant surface blemishes. Correct trapping of slag with properly calculated ingates, runners, etc., will further reduce the possibility of loose sand getting into the mold. During this cooling period, liquid and solid contractions take place throughout the range of changing temperatures, and if the whole mass does not cool down uniformly, stresses are set up within the casting. As practically all crankshaft castings are of various shapes and different cross-sectional dimensions, hindered contraction cannot be avoided and stresses are left within the casting.

In addition, if the pouring and molding methods are such that the additional metal required to make up liquid shrinkage cannot be poured into the mold before solidification takes place, porous patches and zones of weakness may occur at different places in the shaft. The elimination of gasholes, blowholes, dirt, slag and other defects of a similar nature is purely dependent on good foundry practice, but residual casting stresses and porous areas are probably related to the shape and design of the casting.

Foundry technique, by the use of different compositional irons, by use of denseners, correct method of running, and variations of pouring temperature, can help to minimize the bad effects of faulty design and produce a casting which would probably give good service, but at the same time if proper foundry technique is allied to good design, certainty of success is assured.

Early efforts in producing cast crankshafts merely adopted the design of the forged shaft, thereby losing the very real advantage of a cast material which has wide possibilities in molding with resultant improvements of the shape or form strength of the components, whereas the forging process is restricted

o o o

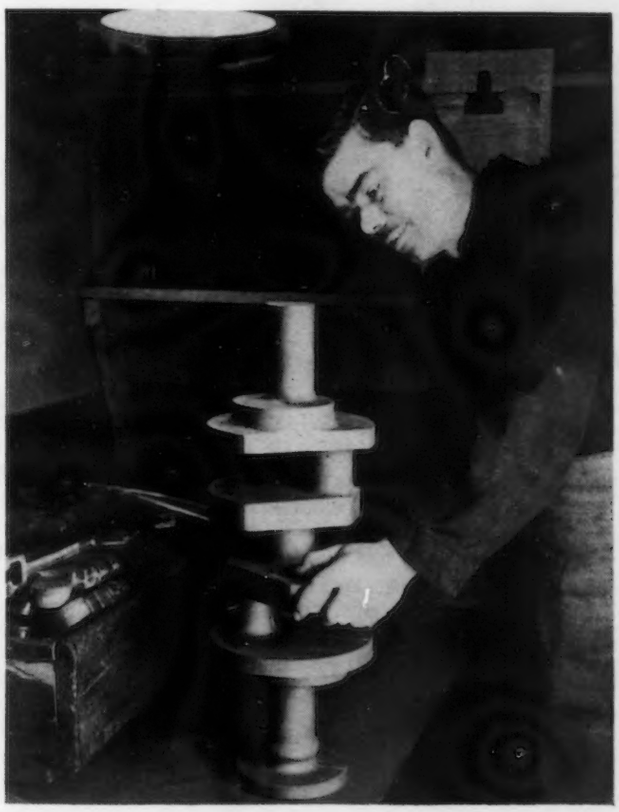


FIG. 4—A maximum of 10 per cent of metal will be machined from this cast iron shaft in the next operations. This compares with as much as 50 to 80 per cent metal removal on forged steel shafts.

o o o

to a form or shape which can be conveniently hammered out.

One other point of importance that can be noted to the advantage of a cast iron crankshaft, is the freedom of the modern high test iron from distortion after casting. This persists well through subsequent machining and is entirely due to its uniformity of internal crystal structure. Irons of this class also respond readily to heat treatment, by which the tensile strength and fatigue and impact strengths of the material can be increased as much as 25 per cent and hardness increased to obtain the best results as regards wear combined with production machining requirements.

Where necessary, local hardening of journals can be satisfactorily and successfully performed by flame or electric methods (Shorter, Tocco, and similar processes).

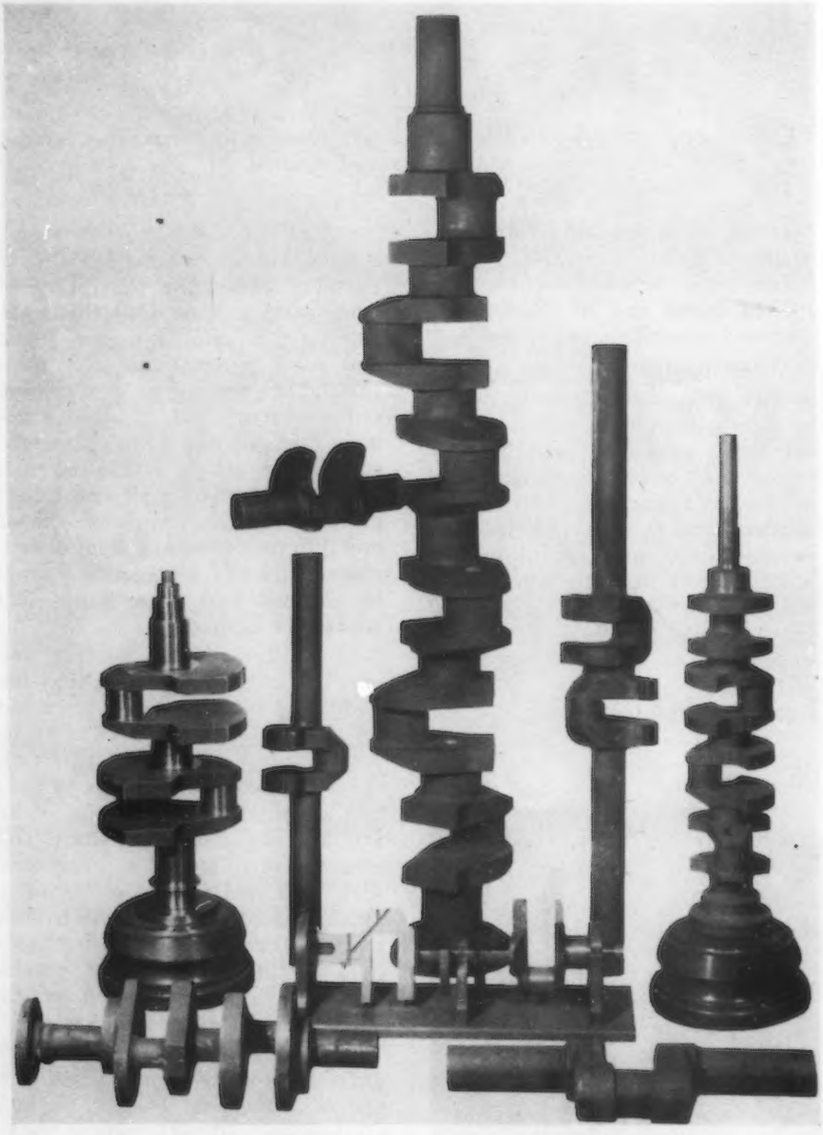


FIG. 6—Group of cast iron crankshafts. The large shaft in the center is for a 1500 r.p.m. diesel engine.

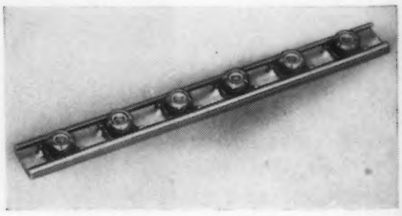
The further development of the high test iron crankshaft in Europe has been rather clouded by the war. Up to the present war many crankshafts had been made and were in successful service, having previously run trials of more than three to four years in automobile and diesel engines. Cast iron crankshafts for small compressors and the smaller gasoline engines, are now in production. The future full-scale development and adoption of the cast iron crankshaft, however, depends only on the ability of the foundry to produce consistently a sound casting in the proper type of iron, the wholehearted cooperation of the designer who realizes the fundamental differences between steel and these high test irons, and therefore designs accordingly, and the engine manufacturer who will test and report more fully than has been done in the past on the performance of such shafts.

Gang Channel Nuts For Industrial Applications

A GANG channel nut assembly, currently used in aircraft construction, is now offered for general industrial applications where a multiple, self-locking, bolted fastening is required. The units are now used on all American-built military and transport planes, according to their manufacturer, the Elastic Stop Nut Corp., Union, N. J.

The factory-assembled strips consist of Elastic Stop Nuts mounted in a metal channel strip which holds the nut lugs under longitudinal flanges. The channel is pierced for the required nut size and the nuts are held in place by dimples. The location of the nuts on the channel corresponds to the bolt holes in the structure to which it is applied. The channel itself is independently fastened to the structure by riveting or welding.

Locking action is obtained by fiber collars which resist the entry of the bolt, forcing the nut outward and creating a constant pressure contact and a cushion against vibration. Although the channel is permanently fastened to the structure, individual nuts may be removed or replaced in the event of damage in application or use. The assemblies are furnished in 6-ft. lengths; nut sizes range from No. 8 through 3/8 in. bolt diameters; and spacings vary from 5/8 to 3 in., depending on nut size and the application involved.



Heat Treating Aluminum Aircraft Parts

ALUMINUM stock used in the construction of military aircraft must naturally follow rigid heat treating specifications, usually furnished by the government through the Army and Navy. These specifications are quite to the point, practical, and for the most part not difficult to follow. They specify the temperature, heating time, heating atmosphere, and quenching medium to be used, and the procedure is usually watched closely by Army or Navy inspectors in the manufacturers' plants. Because heretofore Naval aircraft have operated in salty atmospheres, Navy specifications were considerably more rigid than those of the Army. Salt water atmosphere, causing corrosion, must be carefully guarded against by more drastic heat treatment of the aluminum parts used in plane construction. However, expanded operations by the Army into the tropics and along sea shores will, it is believed, cause Army specification to be tightened up considerably.

In heat treating large aluminum parts of Alclad 24S, boiling water was considered as a quenching medium because reduced quenching is desirable to avoid distortion. The use of boiling water, however, has several disadvantages, including a considerable formation of steam as well as very violent ebullition that results when the load is introduced into the bath. Cold quenching oils, such as the No. 2 soluble quenching oil made by E. F. Houghton & Co., Philadelphia, have proved extremely satisfactory for Alclad sheet parts. It must be remembered, however, that before parts heat treated in this manner can be painted, all traces of the oil must be thoroughly removed.

Oil removal is usually accomplished in several stages, which include: (1) Preliminary removal of existing oil and dirt by washing in solvent solutions. This solution must be frequently replaced to insure cleanliness. Various types of degreasing equipment may also be used. (2) Further removal of the oil by washing or spraying in a hot inhibited alkaline cleaner. (3) Dipping or spraying in a hot 5 to 10 per cent solution of chromic acid.

Solution heat treatment of aluminum alloys consists of heating the sheets, extensions, rivets, or other parts, to a specified temperature below the melting point, soaking at that temperature for the required length of time, and quenching. In wrought aluminum alloys, the alloying constituents, which provide the higher strength and hardnesses, are substances that are more soluble in solid aluminum at high temperatures than at low temperatures. The purpose of this heat treatment, therefore, is to put as much as possible of the alloying constituents into solid solution and to retain them in this condition by quenching.

Heat treatment is carried out in either air or salt bath furnaces. The salt bath has the advantage of saving about 30 per cent of time in the furnace. In the salt bath, the stock is immersed by either hanging it from one or more wires or by immersing it on a rack. This individual method of handling has several advantages over the rack quenching method generally employed when in air furnace practice. Many complicated shapes require careful quenching methods or greatly distorted shapes result. These must be straightened or reshaped, often by hand, thus increasing the cost per part enormously.

When an individual complicated part is quenched by hand from a salt bath, it is possible to follow the contours of the stock in the quench, appreciably lessening distortion and greatly saving time in subsequent straightening. When such a part is quenched from an air furnace it cannot receive individual treatment, as it is part of a load that is generally quenched on a rack. Another advantage of salt baths is that a film of salt protects the stock while it is being transferred to the quench tank. Small parts are often wired together in a staggered position and bundle quenched from the salt bath.

Salt bath heating also provides uniform flow of stock. As it is necessary to restrike or rework a great deal of the stock because of the almost inevitable warpage, and, as this stock must be reworked within an hour or so because of age hardening, it is readily understood that if a great deal of stock reaches the reworkers at one time, difficulties will result, and much of the material will be unfit for service. This can be remedied, however, by storing surplus parts reaching reworkers in a refrigerator at freezing temperatures.

In salt bath heat treating, the operator may start working on one end of a furnace and work progressively to the other end, having the starting end ready to quench by the time he reaches the discharge end. Salt baths, even very large ones, do not materially vary in temperature by such a loading and unloading system, the tempera-

ture staying within plus or minus 10 deg. F.

Long stringer parts are usually placed in a rack and the rack and stock are quenched in a 45 deg. angle position, pushing the stock down and sliding it along the length of the tank to reduce warpage. Even then, stock usually looks like so many intertwined snakes. This stock, immediately after rinsing, is taken to a stretching machine where it is straightened by stretching, which, incidentally, reduces the thickness slightly and increases the strength due to cold working.

Air furnaces for heating must provide means of protecting the work from contact with the products of combustion. For this reason, air furnaces are usually of the electric type. A fan recirculates air past the heating elements and the stock, using an alloy shield between them to act as a duct. Air furnaces are usually of the batch type and are charged with a rack of stock of as much as 1000 lb. or more. Time in the furnace depends on several factors, including the thickness and makeup of the stock, and is counted from the time, after charging, that the thermocouple indicates desired temperature. In all cases, both salt and air furnaces, the furnace must be up to the desired heat treating temperatures before charging the furnace.

Air furnaces may be of the bottom opening type or have an end opening. When bottom opening, there is usually a split bottom through which the stock drops into the quench by means of an elevator. In the end opening type, the stock is rolled out on a track over the quench tank and then quickly lowered in the quench. Fog, spray, or tank quenching are possible with these arrangements.

Heat Treatment of Rivets

Most rivets used in military aircraft construction are made from A17S-T or from 17S-T alloy. In some cases, 24S-T is used. Before heat treating, rivets must be anodized, Alrocked, or some other form of corrosion resisting surface applied, one function of which is to prevent high temperature oxidizing while heat treating. Heating may be done in either air or salt bath furnaces. Salt, sodium nitrate, or an equal mixture of sodium nitrate and potassium nitrate may be used.

When using the salt bath, direct contact of the salt and rivet must be avoided. One convenient design of rivet furnace is a circular pot type of salt bath over which is a mechanically rotated fixture that holds a number of steel cylinders immersed in the salt. The timing is such that, at the proper intervals a cylinder may be removed and the stock therefrom quenched. The steel cylinders are usually 2½ in. in diameter x 12 in. long, and hold about 2½ lb. of rivets. This, at first, may seem a small quantity but when it is considered that about 250 different sizes of rivets are used in the construction of a large bomber and that at least two types of material are used, requiring different treatment after quenching, a 2½ lb. charge is not particularly small. Another reason for the small load is that it would take a long time to heat through a large diameter cylinder and that mass quenching must be avoided.

The more drastic the quench, the better corrosion resistance is obtained. Therefore, the temperature of the quenching water shall be maintained as low as is practical, not exceeding 85 deg. F. as the water enters the tank and less than 100 deg. F. during quenching. The container or tray may not be quenched because the stock must have direct contact with the quench water to obtain a maximum of corrosion resistance. Water must be kept running through the quench tank to avoid over-contamination of the quenching medium.

The A17S-T rivet may be kept at room temperature and will retain its softness indefinitely. Rivets made of this material are usually stained after aging for 24 hr. with a cold solution of potassium or sodium dichromate. This neutralizes any possible trace of salt and identifies them readily as A17S-T rivets. The 24-hr. aging is necessary for the rivet to develop its maximum strength, over 90 per cent of which is reached during that time. The 17S-T rivet, immediately after quenching and drying, must be stored in a refrigerator and kept at subfreezing temperatures. This prevents age hardening which would make the rivet too hard to drive. These rivets must be used within 20 or 30 min. after removal from cold storage, and consequently, only small quantities of these rivets are issued to the riveters at one time.

If 17S rivets are allowed to age more than 2 hr. at room temperature, after quenching, they are usually too hard to be driven. However, by storing at a temperature of —50 deg. F., the rivets remain soft enough for driving for at least two weeks. Within 10 min. after quenching, 24S-T aluminum rivets must be driven to avoid the necessity of continually heat treating fresh material, but age hardening can be retarded by storing at extremely low temperatures, such as those attained by packing in dry ice.

The usual inspection procedure on rivets is to take a 6 in. length of a newly received coil of rivet wire, harden it, age it, and then shear test it. The A17S-T should have a shear value of 25,000 lb. per sq. in. and the 17S-T must have a minimum of 30,000 lb. per sq. in. When the coil is put on production, one rivet from each 2 to 3 lb. that are hardened is set aside to be shear tested.

Heat Treatment of Parts

It is customary to form parts from sheet stock before heat treating. However, during the quench, such parts are considerably distorted making necessary restriking or, in many cases, reforming by hand. This takes considerable time. It is not at all unusual for an operator to spend upwards of 20 min. to hammer a bulkhead or other part back into shape. However, it is often possible to save much of this time by blanking out the piece, hardening it, and then putting it into the draw die before it has time to age harden. Unfortunately, newly heat treated stock does not draw as readily as stock not yet heat treated or in the so-called "SO" condition, so that this method cannot always be applied.

The airplane industry, until very recently, has suffered from a lack of volume orders for one type of ship. This precluded the use of expensive dies and other expensive mass production equipment. Many parts that in the auto industry would be made on a production basis, have had to be made by hand. Now, that large orders have been placed of frozen ship design, it is possible, from a cost standpoint, to make steel dies for many parts.

This procedure enormously speeds up production, reduces the

number of skilled sheet metal workers, and reduces costs. It is quite likely that, by volume production, the cost of air frames can be reduced upwards of 60 per cent. Another thing that could be worked out would be for the manufacturer of the sheet aluminum to make blanks or even parts for the manufacturer of air frames.

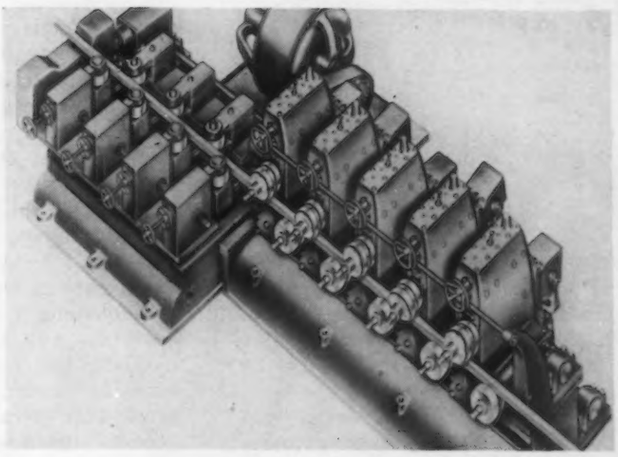
In rolling sheet aluminum, some sheets develop blisters or sound sheets may become scratched in handling. Such sheets when detected are rejected by the inspection department. These sheets have large areas that could be used for other parts by putting templates, supplied by the air frame builders on the usable portions and cutting good blanks from them. This would give the sheet manufacturer a market for what is now virtually scrap and give the buyer a low priced but high grade product. Furthermore, railroad tonnages would be reduced considerably, since a high percentage of even a perfect sheet is wasted due to odd shapes being cut from it. This scrap, if made in the air frame builders plant and if recovered, must be reshipped for salvage purposes to the aluminum producer and this further taxes the railroads.

Aluminum Welding

At present, there is a tendency to substitute spot welding for riveting because it is much faster and saves weight. Unfortunately, airplane designers still are skeptical of spot welds and feel that riveted sections are stronger and more trustworthy. Consequently, rivets are employed in all primary structure and spot welding is used where there is less strain and where a failure will not be so vital.

One reason for the difficulty of obtaining a good spot weld is that the oxide coat that forms on aluminum and protects it from further corrosion also interferes with spot welding. If this coat is removed and spot welding is done immediately, good welds may be obtained. Wire brushing, scraping or some other mechanical means was formerly employed to remove this oxide. This, at best, produces uneven surfaces and again spot welding is made difficult. Now, chemical cleaning is employed, but still the welding must be done immediately after cleaning and best welds are obtained while the parts are still wet so that there has not been enough time for a new oxide film to develop.

Untwisting-Straightening Unit for Bars and Shapes



ONLY one pass is required to untwist and straighten bars and shapes in this new 17-roll machine.

A MACHINE which untwists and straightens bars and shapes in a single operation has recently been developed by Sutton Engineering Co., Pittsburgh. Heretofore, untwisting was generally a hand operation, so there is a considerable saving of time in the new process.

The untwisting unit of the machine uses 10 horizontal rolls, while the straightening element contains seven vertical rolls. All have adjustable center distances and are power driven. Untwisting is accomplished by tilting the top rolls in the horizontal shaft unit. The lower rolls simply rotate in a fixed plane, so the material is untwisted over them. The amount of tilt given to the top rolls is of course progressively lessened in order to first twist the bar past its yield point and then gradually remove this twist so that the bar is completely untwisted before it reaches the seven-roll vertical shaft unit.

The five tilting rolls are fitted with indicators to show the amount of tilt, and all rolls have indicators showing their relative positions to the pass line. The seven-roll vertical attachment, which straightens the shapes after they have been untwisted, is adjustable up and down and sideways through a motor drive to line it up with the horizontal shaft unit.

In addition to untwisting, the machine also removes camber from sections in both the horizontal and vertical planes. It is designed and built in various sizes for both ferrous and non-ferrous metals.

The Spraying o

HAND spraying a valve with zinc to prevent water corrosion.

THE application of the use of metals to the service of mankind is of great historical interest because metallurgical progress has been in line with the development of what we know as civilization, and some have even claimed that the growth of civilization has been dependent on our knowledge of the art of the working of metals. In the early stages of the use of metals, advancement was made by accumulation of evidence based on what can be termed "hit and miss" methods and discoveries due to chance. It is only during the past century that development in the art of working metals has become a result of careful scientific work along planned lines. In these times, for instance, the production of alloys of four or five metals together, is not so much a thing of chance as it was 50 years ago. Scientific methods now allow some forecast as to the lines along which success is likely to be achieved.

One of the most novel commercial forms of metal working is spraying, a process which had its practical beginning in 1909. For many years great difficulties were experienced, and it can be stated that it is only over the past 20 years that the process has become important commercially. The demands of increasing production on the approach of war, gave further necessity of extension, and as a result, in the past five years or so, the literature of the process has become very considerable in all parts of the world. As metal spraying is a comparatively young growth, it may be expected that all this literature is not of equal standard or of equal value, and it is therefore of interest to consider the lines along which development has been achieved, especially taking into consideration the incidence of scientific investigation.

As is generally known, the originator of the process is Dr. Max U. Schoop, of Zurich. In the early days, the evolution of the process was due almost entirely to Schoop and his collaborators, and if one examines the chronological order in which patents were taken out, it is quite obvious that the developments were not due to "hit and miss" methods, but were due to careful scientific planning along reasoned lines. This is quite obvious if one consults the book of Schoop and Gunther, which gives a historical survey of these early struggles.

Reference to the patent literature of the time will show that the first master patent was for the spraying of molten metal. The raw material of this process can be considered as metal in the molten form which was presented by various means to a stream of gas. The use of molten metal must have appeared clumsy to the original investigators, and a more mobile system seemed desirable. The next advancement was that of the use of a metallic powder, the powder being presented to the propellant stream. The most recent development was that of using a solid metal in wire form, and has been the basis of the metal spraying industry throughout the world.

The master patents were sold or licensed by Schoop in most countries of the world, and each separate country started to adapt the process to its particular industrial needs. It must be remembered that at this time metal spraying was entirely new, and it had the advantage, from one point of view, that it was somewhat spectacular. To be able to pass a metallic wire through a small tool fed with gas which, burning, melts the wire, and yet be able to deposit the metal as a coating onto a photographic film without damaging the gelatine, seemed to be almost a miracle. It was perhaps because of this that the process seemed to be one on which financial manipulations could be based, and it was perhaps because of desire to make money quickly that exaggerated claims were made as to its possibilities. It cannot be disputed that even today those interested in the process find that there are certain adverse reactions in some quarters that can be traced back over the years to this period of exaggeration. It is therefore very unfortunate that even today there is a tendency in some countries to exaggerate the benefits of the process.

Until about 1920 the commercial expansion of the process was in the hands of the owners of the master patents in each country. This meant that in some countries the tendency was to leave its perfection entirely alone and endeavor to make money by making claims and selling apparatus quickly. In other countries development was held down because the controllers of the patents were always being inconvenienced by changes in the financial aspect of their particular group. It will also be realized that the position might have stabilized itself much faster had it not been for the incidence of the World War of 1914 to 1918. In England the process was practically moribund during that period, and very little use was made of its possibilities in the armament industry. In Ger-

...g of Metals

o o o

By W. E. BALLARD
Managing Director, Metallization, Ltd., Dudley, England

o o o

. . . Here the art of metal spraying is examined from infancy to the present time by a recognized British expert. It must be emphasized, however, that frequently Mr. Ballard is disinclined to fully recognize the tremendous growth of commercial practice in this country and the use of techniques and equipment frequently far advanced over that available in Europe.

o o o

many and France some progress did take place, and certainly, soon after the war period, it must be placed on record that the development was most rapid in Germany, and a good deal of money and time was expended on the perfection of the art.

It is rather extraordinary that the majority of the work was carried out on the perfection of the apparatus for metal spraying, and in this period only a comparatively small amount of the effort appeared to be given to the actual type of coatings produced. For instance, a good deal of work was undertaken to produce metal spraying tools capable of enormous output. This consisted of tools with a multiplicity of nozzles and others having a system of multi-jets combined in one nozzle intended for spraying metallic ribbons. During this period the trend may be considered as being mostly that of bringing to bear mechanical ingenuity to overcome the difficulties of the process.

It was largely because of German work that the spraying pistol became a tool that could be used commercially without frequent stoppages, and with a minimum of skill, although it is only fair to say that Schoop and his collaborators were working along similar lines. It was obvious to the German workers that the pistol was not suitable for spraying tubes internally and they therefore developed the very clever rotary nozzle as used today for the spraying of internal surfaces.

The method of driving the wire feed was also investigated and many types of drive were considered and afterwards fell into disuse. In this connection it is interesting to note that in Italy a metal spraying pistol was commercialized to a small extent, using a small air driven motor in place of the usual turbine. Many types of blowpipes were patented for the after-treatment of the coatings produced, these sometimes being attached to the pistol and sometimes being used independently.

The type of coating produced did not appear to receive the same meticulous attention, although Hopfelt in Altoona made use of aluminum coatings, afterwards heat treated, for the prevention of high temperature oxidation. Also patents were taken out, mostly in Germany, for saturating the sprayed deposits, which were somewhat porous, with various chemical compounds, including solutions of bakelite. Never-

o o o

THIS aircraft cylinder barrel is being metallized with pure aluminum to protect it against corrosion. Many other airplane parts, such as external oil lines and steel fittings used in conjunction with aluminum supports, are protected against corrosion in this manner. Automatic equipment is available in United States for this type of spraying.

Forty-ninth in a Series of Articles on the Technical and Economic Aspects of Metal Cleaning and Finishing.

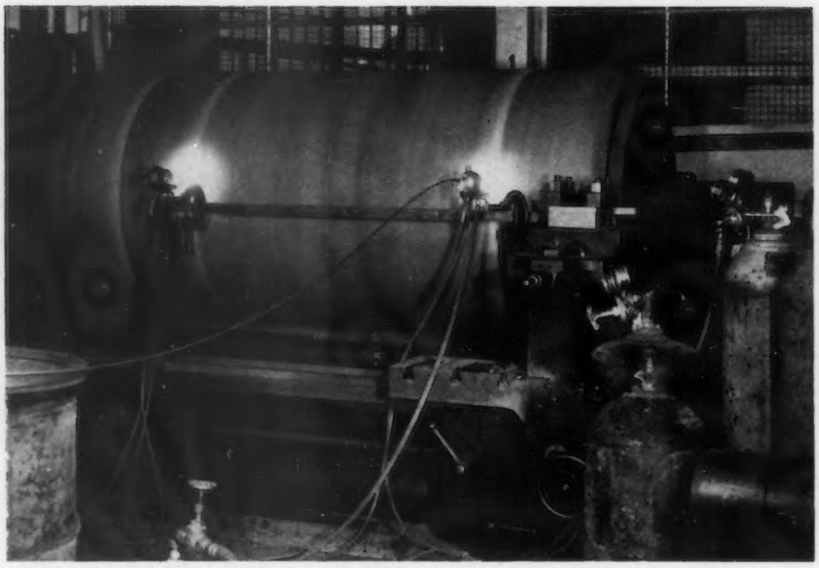
theless, the fitting of the actual coating produced to the conditions under which it would give the greatest service did not receive the attention that was bestowed on other aspects which were more or less mechanical. It can be stated, however, that the process of metal spraying was becoming known, and was being fitted to industries which had need for this type of metallic coating.

The master patents in many countries were still in force, and owing to systems of granting exclusive licenses for various industries, the process was used somewhat unfairly to the advantage of those firms who had been first in the field. As the master patents gradually became void through lapse of time, it was quite obvious that competition would increase, and it is interesting to note that as the molten-metal master patent was the first to expire, the molten metal pistol was the first to be resuscitated in competition with the wire pistol. An example of this is in the Mellowes system of molten metal spraying known as "Mellozing." This process will produce coatings of the more fusible metals.

The next patents to become void were those which dealt with powder spraying, and this led to the development of the Schori powder system, but the original holders of the metal spraying patents adhered to the wire system which still is by far the most important commercially. The wire system allows the spraying of all metals, even those which melt at high temperatures, such as steel and nichrome, and, generally speaking. the types of coating produced are much more dense and controllable than those produced by the powder system.

In Great Britain the development of the process did not actually commence commercially until about 1922. Owing to arrangements that had been made with the French and German companies, it was possible for the British company to have available the mechanical excellencies which had been achieved by workers in Germany and in France. The British workers took a rather different line from that taken by most of the other countries in that they looked to the development of the process not so much from the tools used but to the type of coating produced and its use in industry.

It is quite obvious that metal spraying can only hold a small proportion of the market for metallic coatings. It is not likely to render obsolete electro-deposition for the majority of decorative work. It is not likely that metal spraying will completely supersede the old processes of hot tinning and galvanizing. It is, however, certain that the art of metal spraying has its use in industry, and will often produce a coating which is absolutely essential for the type of work that has to be done.



THIS cast iron dryer roll, 42 in. in diameter, 100 in. long, and 3½ in. thick, is being sprayed with a heavy coating of Metcoloy No. 1, stainless steel, and required about 340 lb. of metal. To finish the roll, a machine cut was taken across the sprayed face, the surface finish-ground and polished. Corrosion resistance and fine finish was the desired result of this treatment.

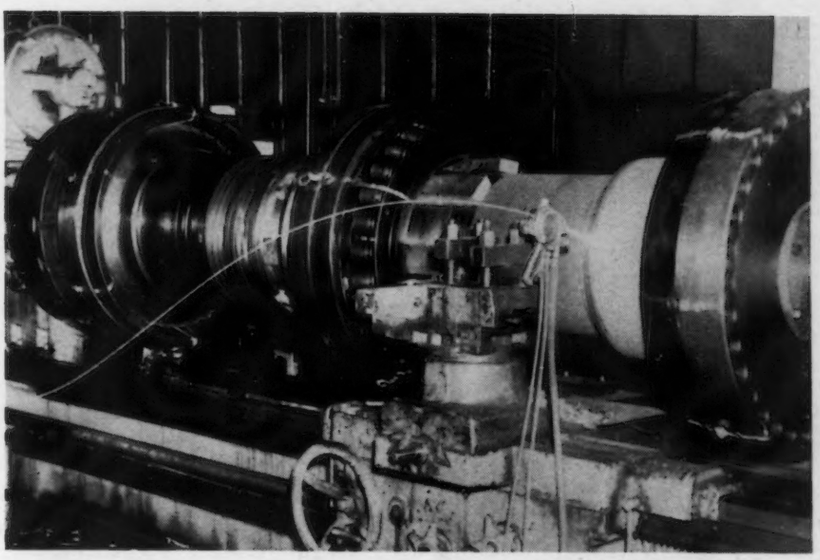
This was the line of thought of the British workers, and the development of the coatings has become, stage by stage, of the highest industrial importance. To give one instance of this, in Great Britain it was felt that the process in which aluminum coatings were used to withstand high temperature oxidation was of great commercial importance. It will be remembered that development in Germany had been made along this line with some success, but the method used did not always give the necessary results.

The method was to coat the aluminum sprayed article with waterglass and then heat treat in a furnace, the waterglass acting as a flux to protect the aluminum during the period when it was being absorbed into the steel base. The action of waterglass was found to be uncertain and in Great Britain therefore, other processes were developed which gave more certain results, but it was not claimed by any of the British workers that the coatings so produced were effective for long periods over 1742 deg. F.

Development of the process in Great Britain was along the lines of understatement of its usefulness rather than the overstatement which had caused disaster and reminded the user of the early claims for metal spraying which had not been substantiated. The development of aluminizing in Great Britain has been extremely rapid, and the process has achieved great industrial importance.

British results have provided an incentive for expansion in America and the pictorial representation of work carried out in England form the basis of the publicity given to the protection against high temperatures by heat treated sprayed aluminum coatings. The rules of censorship are, of course, unfortunately quite strict, but it must be obvious to any reader how great are the uses of the aluminizing process, to give it its British name, in connection with the war effort of today.

The evolution of coatings for other purposes has not been less than those of aluminizing, and no



THIS spindle, 22 in. in diameter, is part of an axle-testing machine and is being built-up at the worn bearing seats with Sprasteel No. 25. Prior to spraying, the surface was roughened.

doubt when peace is won there will be made available in scientific journals a great deal of extremely critical and useful information on the properties of metal sprayed coatings as used in the war effort. Probably because galvanizing was very popular, much of the early publicity on metal spraying was given to the properties of zinc coatings, and comparatively little was known of the properties of thin coatings of metal sprayed aluminum.

Some years ago Dr. Ulick Evans and his collaborators at Cambridge, England, described a series of tests which appeared to show that sprayed aluminum coatings had very great protective value, in certain cases much more than the value given by the excellent zinc deposits. It has now been definitely established that the small porosity of aluminum coatings as produced by spraying, which makes sprayed coatings unsuitable for protection against nitric acid, as compared with solid aluminum, gave remarkable protective value in cases where solid aluminum would be subject to violent corrosion.

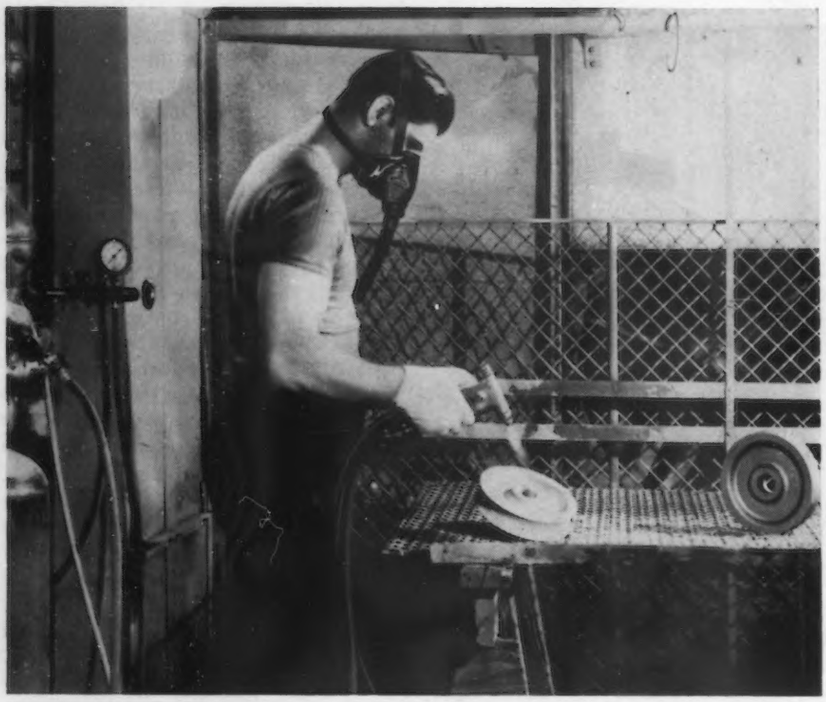
It is well known that aluminum and its alloys in certain circumstances take up films of oxide which are insoluble and protective. In fact, this is the basis of the anodizing process. In sprayed aluminum coatings, these films not only surround the particles produced, but fill in the porosities during the first few hours of life. The result is that thin aluminum coatings produced by metal spraying, resist atmospheric corrosion extremely well and are marvelously protective to steel. To take an extreme case, it may be of interest to note that protection over a long period is possible by a thin coating of aluminum on a cast iron propeller of a trawler. It is amazing that such protection should even be worth while considering under these conditions, and yet this has been proved. It is quite obvious that aluminum coatings, being light and so protective, are playing their part in the war effort, particularly in aeronautics.

The protective value of sprayed coatings cannot always be evaluated by consideration of the properties of the metal in the wrought form. An instance is cited above in the case of aluminum coatings. It is therefore regrettable that a list giving the corrosion resistance of certain metals and alloys in the wrought form to various corrosive media should be published in literature dealing with sprayed coatings, as the inference that the deposit will have the characteristic of the wrought material is not sound and may cause serious breakdowns. In some cases the deposits may even be more anti-corrosive than the solid material, although this is not usual. Another regrettable feature of some published work is the tendency to refer to the thickness of deposits as being a number of passes or coats. A little reflection will show that this type of statement is of little or no value. Today, with the advent of the electromagnetic thickness tester, there is no reason why the thickness of deposits cannot be precisely given and checked in the case of all non-magnetic coatings on a magnetic base.

Thus far, the use of metal spraying for protective coatings has been cited, but there is another use for deposits of steel, stainless steel, etc., which can be summed up as reclamation. It is strange that, as far as we know, German workers have not been so interested in this aspect, although the results of critical experiments have been published by Thormann in Karlsruhe. Developments of this aspect of metal spraying have been rapid in France, Britain and the United States, and it has been interesting to follow the growth of the idea of reclaiming worn parts by metal spraying in these countries. In America and in France, advancement was made along the lines of trying built-up parts commercially, and learning by success and failure.

Considering this method as being somewhat dangerous as a rule, it is interesting to note how few failures have been made compared with the successes achieved. In Great Britain the development took an entirely different form in that a good deal of experimental work was carried out and published as to the scientific reason why metal spraying should be good for reclamation before the process was exploited on a large scale commercially. It was found that again the porosity of the deposited metal was in fact not its disadvantage, but its advantage, and it has now been definitely proved that it is this small porosity that enables the parts treated to maintain the oil film under adverse conditions. The British investigation of this matter, undertaken by Harry Shaw and presented to the Association of Metal Sprayers in Great Britain, has now become a standard work, and his results have been used as a basis for further development in America.

This article gives a general survey of the development of metal spraying as an art, and should make it clear that further discoveries may be expected, especially as rule of thumb or hit and miss methods are fast disappearing from the schedule of advancement of this in-



VARIOUS articles subject to weather conditions or water exposure can be protected with sprayed zinc, such as is being done here.

dustry. Development in Great Britain, at any rate, will be following the line of careful examination of the coatings produced and in the light of their ultimate purpose. Experimental work, at the moment, is showing some divergence with regard to the practice in Britain and in America.

From American literature it appears that great stress is laid on the ability of a metal spraying tool to deposit a coating quickly. It is quite obvious that this is economically sound always providing that the cost of rapid deposition is not in excess of the benefit obtained. Unfortunately recent work in Great Britain would appear to indicate that rapid deposition is far from satisfactory in many cases, as the type of coating suffers and it is only possible to recommend rapid deposition in comparatively few cases. The tendency in Great Britain is not to exceed a wire diameter of more than 0.07874 in. or 2 mm. except in special cases, and in many more cases where specially excellent coatings are desirable, due to conditions of service, it has been found necessary to use wires of only 0.03937 in. or 1 mm. in diameter with a comparatively slow rate of deposition.

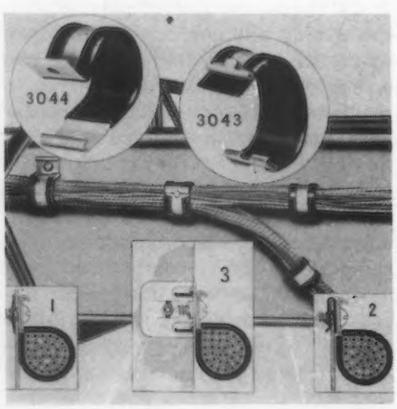
The tendency in America would seem to be towards using heavier gages of wire and it will be interesting to note in the future whether this divergence persists. It should be made quite clear that there is no particular art necessary in the consideration of metal spraying pistols either for using light or heavy gage wires, as the principles of pistol construction are now purely a matter of mathematics and choice of material, and at least in this essential, rule of thumb methods may be disregarded.

Finally it may be considered by some that the use of high pressure gases for melting ever since the invention of the process, does not give much indication of advancement. It appears quite obvious that an electric pistol would be ideal, and at first thought this would appear to be quite indisputable. Electric pistols of the arc type have been produced by Shoop and others, but certain difficulties are experienced in their use commercially. At the moment, the gas pistol would seem to be more than holding its own, and it is extremely doubtful whether the electric pistol, which will possibly be the tool of the future, will make use of the arc principle. This is a matter, however, of speculation only, and will be proved or disproved by the passage of time.

Speed Clamps for Bundling Wire

TWO new series of harness speed clamps, introduced by Tinnerman Products, Inc., Cleveland, permit faster attachment of multiple strands of wire in aircraft assembly. Both fasteners have latching means to permit holding the bundles of wires together during sub-assembly operations and while transporting the wiring to the final assembly locations.

The clamps are covered with plastic channels which provide cushion for the wire and withstand abrasion. The No. 3043 series are used at intermediate locations and where groups of wires branch off from the main bundle, while series No. 3044 are supporting clamps for attachment to the main structure of the assembly.



The No. 3044 series, as shown in the illustrations, have three methods of attachment to the assembly: (1) with standard flat type speed nuts, (2) with U type speed nuts snapped over the edge of a flange, and (3) with the new, bracket type speed nut for attaching at various angles. The harness speed clamps are available in 10 different sizes to accommodate bundles of wiring ranging from ¼ to 1½ in. in diameter.

Cartridge Brass Hardness Conversion Table

A STUDY of hardness conversion relations for various materials was made by a special sub-committee under the section on indentation hardness, of Committee E-1 on methods of testing of the American Society for Testing Materials. In view of the pressing need for this information on cartridge brass, the conversion relations on this metal were prepared first, but similar hardness conversion standards for heat treated steels and other materials will be prepared as quickly as possible.

Results of tests conducted at the laboratories of Frankford Arsenal, American Brass Co., American Rolling Mill Co., Wilson Mechanical Instrument Co. and the Bell Telephone Laboratories were used as a basis for the conversion tables. In the examinations, a set of 16 variously tempered blocks of cartridge brass was sent to each cooperating laboratory. At each laboratory, from five to 10 readings were made on each block using each of the following scales: Diamond pyramid hardness, 10, 20 and 30 kg.; and Rockwell hardness B and F scales and superficial scales 15-T, 30-T and 45-T. In addition, Brinell hardnesses using a 500-kg. load were made on those blocks thick and hard enough to eliminate anvil effect in the test.

These data were compared with experience data on similar material that had been collected over a period of time at the various laboratories. The data from the present tests check very satisfactorily with the information collected previously.

The new conversions, in Table I, show the relationship between diamond, Rockwell and Brinell hardnesses of cartridge brass sheet, strip and disks as covered by A.S.T.M. designation B19 and for the tentative specifications for cartridge brass cartridge case cups, designation B129 of A.S.T.M.

Hardness of the materials shall be determined with the diamond pyramid, Rockwell, Rockwell superficial, or Brinell hardness test methods. The diamond pyramid hardness is determined by forcing a square base diamond pyramid with an apex angle of 136 deg. into the specimen under 5 to 50 kg. loads, and measuring the diagonals of the indentations. This hardness is defined as the load per unit area of surface contact in kg. per sq. mm., as calculated from the average diagonal as follows:

$$\text{D.P.H.} = \frac{2L \sin \frac{a}{2}}{d^2}$$

where: D.P.H. = diamond pyramid hardness
d = length of average diagonal, in mm.
a = apex angle of 136 deg.
L = load in kg.

Rockwell hardness is determined by the standard method of test for Rockwell hardness of metallic materials, A.S.T.M. designation E18-36, scales B and F, while the tentative method of test, A.S.T.M. designation E18-39T, scales 15-T, 30-T and 45-T covers the Rockwell superficial hardness tests. The standard method of test for Brinell hardness is covered by A.S.T.M. designation E10, for the 500-kg. load test.

The values in Table I are recommended for use in converting the results of one form of hardness test to another only when the specific test procedures and precautions outlined in the several hardness test methods covered by the various A.S.T.M. test designations are followed. The conversion values are applicable only in the case of hardness test results obtained on flat specimens of cartridge brass of sufficient thickness so as to avoid anvil effect, which thickness, roughly, is 10 times the indentation depth.

TABLE I

Proposed Hardness Conversion Table for Use on Brass (70 per cent Copper, 30 per cent Zinc Alloy)

	Rockwell Hardness Number		Rockwell Superficial Hardness Number			Brinell Hardness Number
Diamond Pyramid Hardness Number	B Scale, 100-kg. Load, 1/16-in. Ball	F Scale, 60-kg. Load, 1/16-in. Ball	15-T Scale, 15-kg. Load, 1/16-in. Ball	30-T Scale, 30-kg. Load, 1/16-in. Ball	45-T Scale, 45-kg. Load, 1/16-in. Ball	500-kg. Load, 10-mm. Ball
45	....	40.0	....	....	....	42
46	....	43.0	....	....	....	43
47	....	45.0	....	....	....	44
48	....	47.0	53.5	....	....	45
49	....	49.0	54.5	....	....	46
50	....	50.5	55.5	....	....	47
52	....	53.5	57.0	....	....	48
54	....	56.5	58.5	12.0	....	50
56	....	58.8	60.0	15.0	....	52
58	....	61.0	61.0	18.0	....	53
60	10.0	63.0	62.5	20.5	....	55
62	12.5	65.0	63.5	23.0	....	57
64	15.5	66.8	65.0	25.5	....	59
66	18.5	68.5	66.0	28.0	....	61
68	21.5	70.0	67.0	30.0	....	62
70	24.5	71.8	68.0	32.0	....	63
72	27.5	73.2	69.0	34.0	....	64
74	30.0	74.8	70.0	36.0	1.0	66
76	32.5	76.0	70.5	38.0	4.5	68
78	35.0	77.4	71.5	39.5	7.5	70
80	37.5	78.8	72.0	41.0	10.0	72
82	40.0	80.0	73.0	43.0	12.5	74
84	42.0	81.2	73.5	44.0	14.5	76
86	44.0	82.3	74.5	45.5	17.0	77
88	46.0	83.5	75.0	47.0	19.0	79
90	47.5	84.4	75.5	48.0	21.0	80
92	49.5	85.4	76.5	49.0	23.0	82
94	51.0	86.3	77.0	50.5	24.5	83
96	53.0	87.2	77.5	51.5	26.5	85
98	54.0	88.0	78.0	52.5	28.0	86
100	56.0	89.0	78.5	53.5	29.5	88
102	57.0	89.8	79.0	54.5	30.5	90
104	58.0	90.5	79.5	55.0	32.0	92
106	59.5	91.2	80.0	56.0	33.0	94
108	61.0	92.0	....	57.0	34.5	95
110	62.0	92.6	80.5	58.0	35.5	97
112	63.0	93.0	81.0	58.5	37.0	99
114	64.0	94.0	81.5	59.5	38.0	101
116	65.0	94.5	82.0	60.0	39.0	103
118	66.0	95.0	82.5	60.5	40.0	105
120	67.0	95.5	....	61.0	41.0	106
122	68.0	96.0	83.0	62.0	42.0	108
124	69.0	96.5	....	62.5	43.0	110
126	70.0	97.0	83.5	63.0	44.0	112
128	71.0	97.5	....	63.5	45.0	113
130	72.0	98.0	84.0	64.5	45.5	114
132	73.0	98.5	84.5	65.0	46.5	116
134	73.5	99.0	....	65.5	47.5	118
136	74.5	99.5	85.0	66.0	48.0	120
138	75.0	100.0	....	66.5	49.0	121
140	76.0	100.5	85.5	67.0	50.0	122
142	77.0	101.0	....	67.5	51.0	124
144	77.5	101.5	86.0	68.0	51.5	126
146	78.0	102.0	....	68.5	52.5	128
148	79.0	102.5	....	69.0	53.0	129
150	80.0	....	86.5	69.5	53.5	131
152	80.5	103.0	....	....	54.0	133
154	81.5	103.5	....	70.0	54.5	135
156	82.0	104.0	87.0	70.5	55.5	136
158	83.0	104.5	....	71.0	56.0	138
160	83.5	....	....	71.5	56.5	139
162	84.0	105.0	87.5	....	57.5	141
164	85.0	105.5	....	72.0	58.0	142
166	85.5	....	....	72.5	58.5	144
168	86.0	106.0	88.0	73.0	59.0	146
170	87.0	....	....	....	59.5	147
172	87.5	106.5	....	73.5	60.0	149
174	88.0	....	88.5	74.0	60.5	150
176	88.5	107.0	....	....	61.0	152
178	89.0	....	....	74.5	61.5	154
180	90.0	107.5	....	75.0	62.0	156
182	90.5	108.0	89.0	....	62.5	157
184	91.0	....	....	75.5	63.0	159
186	91.5	108.5	....	76.0	63.5	161
188	92.0	....	89.5	....	64.0	162
190	92.5	109.0	....	76.5	64.5	164
192	93.0	....	....	77.0	65.0	166
194	....	109.5	....	....	65.5	167
196	93.5	110.0	90.0	77.5	66.0	169

Tubes Combined with Rolled

By H. S. CARD

o o o

ONE of the reasons why the round tube section has not been more widely used in structural design is that it has so often been assumed that it is necessary to make profile fits between tubular members in order to have a satisfactory joint for welding. Joints designed on this principle require a considerable amount of detail work, particularly in the preparation of the parts for welding. Furthermore, it is usually necessary to hold the dimensions of the preliminary shaping to relatively close tolerances in order to be sure of a fit-up which will not add unduly to the difficulty of welding and the time consumed. This is a problem with which the petroleum industry and the piping industry had to contend for a long while, until satisfactory machine gas cutting equipment and procedures for cutting pipe ends rapidly were developed.

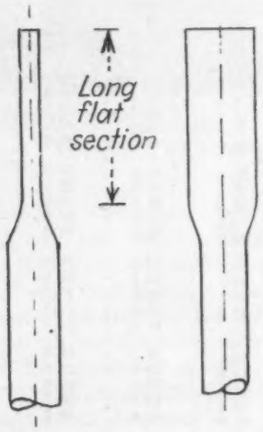


Fig. 1—Flattened tube end.

Another factor which has affected the joint design of tubular structures is that in numerous applications the calculated stresses on the joints were such that it was deemed necessary to insert gusset plates for reinforcing and stiffening the joint assembly. Here again is an example where accurate layout and accurate cutting are essential for a satisfactory fit-up for the welders. It is assumed that any structure involving an assembly of tubular members will be a welded assembly, since the introduction of any parts of the nature of mechanical fittings would add appreciably to the cost and would also require the use of larger wall thicknesses than are considered necessary in welded tubular construction.

FIG. 2—Foot-operated hydraulic vise which is adaptable to flattening tube ends.

Since the development of fusion welding for the joining of pipe for transmission lines for all kinds of liquids and gases and for all requirements of pressure and temperature, the interest of structural engineers in the use of the round tube section has steadily increased. There has been some study to develop types of joint design which would be satisfactory from the standpoints both of safety and of fabrication cost. In some cases the design of the whole assembly has been based on using flat rolled sections for tension members and the round tube section for compression members. The reason for this is that the round tube section, having the same radius of gyration in all directions, is the ideal section for compression or column loads whereas it presents no particular advantage in comparison with any other section for tension loads. There are numerous ways in which the round tube can be designed for joining to other sections at a comparatively low cost. In fact, the cost can often be made much lower than that of joining two rolled sections together by riveting.

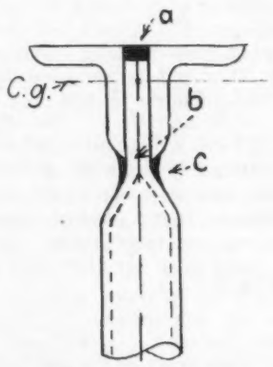


FIG. 3—Beam to column type of connection with flattened tube and two structural angles.

One method for the assembly of tubes to flat sections, or to other tubes, is that of flattening the tube

Shapes In Structural Design

in the neighborhood of the intersection. A flattened tube end is readily joined to any other members either by bolting or by welding. However, it is usually advantageous to use welding whenever the connection is to be permanent and to resort to bolting only for those connections which may need to be removed for dismantling. Therefore, in the sketches used to illustrate the various methods of developing flattened tube connections, it is assumed that all joints are to be permanently welded.

A very interesting possibility in the use of flattened tubing has been suggested by H. H. Moss, development engineer of the Linde Air Products Co. The method of preparation of the tube is illustrated in Fig. 1. This flattening can be done in a power press when the production volume is large or in some type of hand press or brake when the volume is very small. There has recently been developed a foot operated hydraulic vise, shown in Fig. 2, which is powerful and quick-acting and which could be easily fitted with special shaping dies if it were desired to have a gradual tapering down of the tube without any sharp angles. Something of this type would probably be of high utility for small production or for flattening tubes at the erection site.

. . . Comparatively simple welded joints can be obtained by using tubes with flattened ends. For other types of joints in welded tubular design, the reader is referred to an article by Mr. Card in the Nov. 13, 1941, issue of THE IRON AGE.

o o o

Fig. 3 shows how the flattened tube can be combined with two angles back to back in order to make a beam-to-column type of connection. If this were to be applied to the fabrication of trusses, it is obvious that it would be a simple matter to devise jigs in which these component members could be inserted for welding. There would then be three very simple welds at each joint of this type. One weld at *A* would join the tube solidly to both angles and also tie the angles together at that point. The welds at *B* and *C* would join the toes of the angles to the tube wall. A significant feature in the economy of this assembly is that for the weld at *A* no preparation normally would be required, since the flattened end of the tube would be cut off squarely in a shear, or with a saw or a cutting torch. Various joints for double and single angle iron chords respectively are shown in Figs. 4 and 5.

For a simple, lightweight truss the designs shown in Fig. 5 for the eave joint, ridge joint and panel joint should be thoroughly satisfactory. Again there is very little cost involved in the preparation of joint edges for welding. It should be borne in mind that the thickness of the tube wall is only a fraction of the thickness of a rolled structural section, such as an angle, which would usually be selected to carry the same load. It can be shown mathematically that tubes with a wall thickness as small as 0.05 in. are perfectly satisfactory web members for roof trusses. This would produce a flattened section 0.10 in. thick, which is ample for easy welding.

Another factor to be taken into account is that the center of gravity lines of all members in the joint

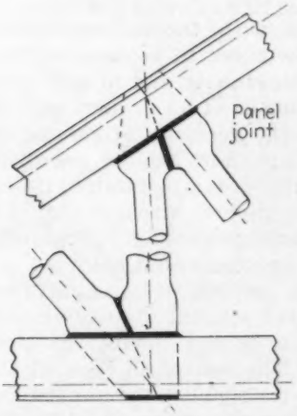


FIG. 4 — Details of light weight truss employing tubes for the compression members and double structural angles for the tension members and top chords.

o o o

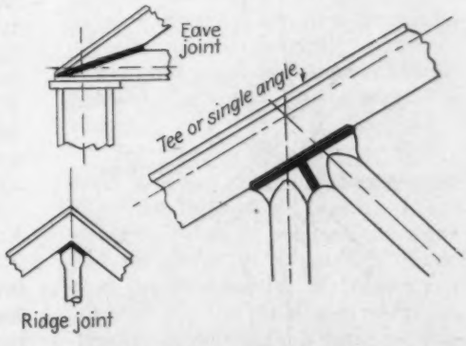


FIG. 5—Where single structural angles are used for the chords, the tubes are simply butt welded to the edge of the angle leg.

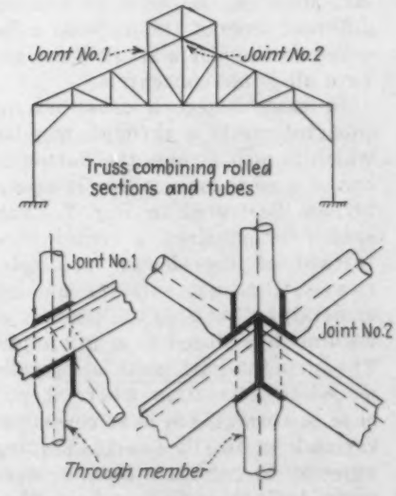


FIG. 6 — Hypothetical application of tubes and flat rolled sections in the design of a roof truss.

designs shown in Figs. 4 and 5 intersect at a common point. We have, therefore, an absolute fixation of the web members and a joint that is entirely free from any eccentric loading. This justifies the use of light members because the design necessarily gets the utmost service from all of the material in the various members. Of further interest is the fact that the flattening of the tube at the connection provides necessary transition material for proper distribution and transfer of stresses at point of connection.

A hypothetical application of this joint design combining flat rolled sections with tubes is suggested in the truss shown in Fig. 6 where all chord members are assumed to be flat rolled structural sections and all struts to be made of tubing with flattened ends. The detail of joint No. 2 shows very well how neatly

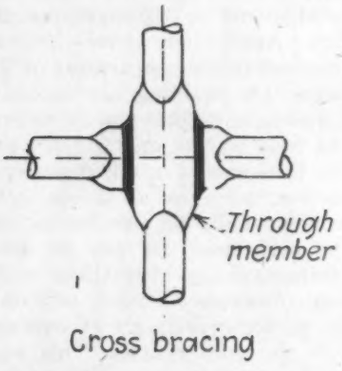


FIG. 7—Welded intersection of through tubular member and tubular cross-bracing member with flattened ends.

the design principle suggested by Mr. Moss can be used to combine different sizes of tubing with a flat rolled section for a single joint and have all joints concentric.

In cases where a cross-bracing tube intersects a through member which is also a tube, the flattening can be used to make a simple assembly as illustrated in Fig. 7. This sketch emphasizes a noteworthy feature of the design principle; namely, that not only the amount of detailing but also the amount of welding is reduced to a minimum. The straight butt weld is logically placed in a position where it will have to work. This is somewhat at variance with the early welding practice in which attempts were made to locate welds where they would be least likely to be stressed. Modern welding design recognizes that the weld metal is equal to the

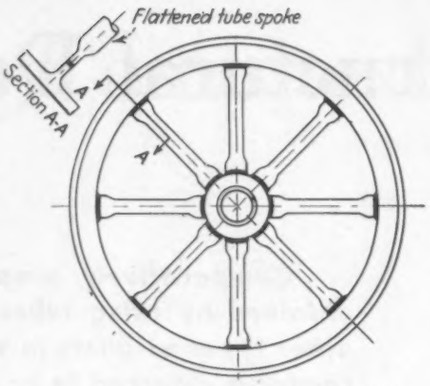


FIG. 8—Tubes with flattened ends are used for the spokes of this wheel with T-section rim and hub.

parent metal in physical properties, that the butt weld is the strongest and most dependable kind of weld that can be used and that it is sound practice from a standpoint of economy and safety to use the least possible amount of welding.

It is worth noting moreover that the use of the flattened tube is not limited to the structural field. Fig. 8 is a diagrammatic sketch of the construction of a wheel using formed T-sections for rim and hub, and tubes with flattened ends for spokes.

Somewhat different ideas are involved in a method of joining tubes developed by A. K. Mosley, architect, of Troy, N. Y., and registered as the "Mosley Welded Stamped Tubular Construction." The general principle of this design is illustrated in Fig. 9. This contemplates the use of tubular members throughout. It also contemplates

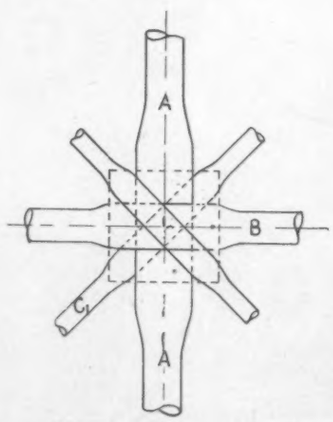


FIG. 9—General arrangement of the Mosley welded stamped tubular construction.

the overlapping of all members so that the total thickness of metal at the joint is equal to twice the combined wall thickness of all of the tube members, plus the thickness of gusset plates in case it is considered feasible to use them for the sake of providing additional stiffness at the joint. Possible variations of this design are illustrated in Figs. 10, 11 and 12. In Figs. 10 and 11 a gusset is placed through the center of the main tube to give added stiffness at the welded joints. The design in Fig. 12 provides diagonal braces with an extra offset from the gusset to the horizontal member. The purpose of this is to provide about double the amount of welding in order to resist any extraordinary stresses.

Figs. 9 and 10 contemplate an

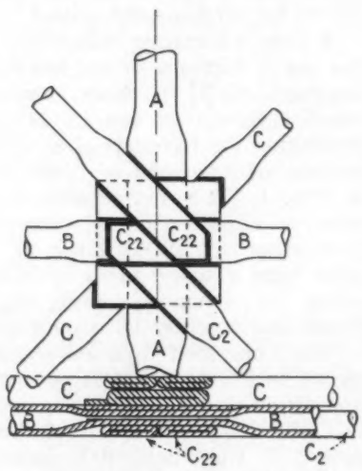


FIG. 10—Modification of Fig. 9, with some tubes butt welded to center gusset plate.

original use of tubular construction to allow tubes to be used continuously lengthwise and in any or all directions. This arrangement avoids the necessity of cutting the tubes into short lengths and thereby contributes substantially to obtaining higher strength for any given amount or weight of material used. Another result obtained is a greater amount of strength from any given amount of welding area —and a smaller number of labor hours. The designs in Figs. 11 and 12 also contemplate the use of tubular construction where short lengths may or must be used. They involve a somewhat greater total weight for an equal strength and a greater total number of labor-hours in comparison with Figs. 9 and 10.

Several years ago, E. Vom Steeg,

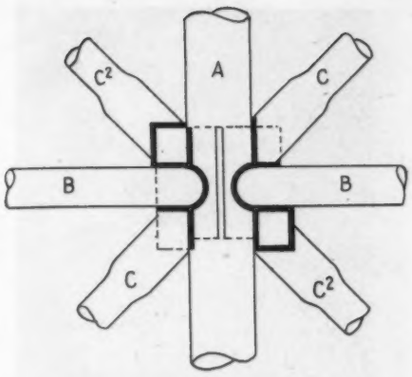


FIG. 11—Short tube lengths may be used with this type of Mosley joint.

welding specialist of the General Electric Co., developed the designs illustrated in Figs. 13 and 14 as a possible means of eliminating much of the detail involved in assembly of tubular fuselages for aircraft. One application of this design is the assembly of three small tubes to one larger tube chord member (Fig. 13). Here a gusset plate extending through the chord is used. The method for joining the flattened ends of the tube to the gusset is thought to relieve the necessity for cutting the tube to very close tolerances, thus reducing both fit-up time and preparation time.

Fig. 14 shows the suggested method of joining a tube underneath the chord to the same gusset plate that is used in Fig. 13. It also illustrates in one dimension one principle of the method of flattening which is contemplated; that is, to have a gradual taper rather than a sharp flattening. A top view of this is shown in the same illustration and will serve to bring out the purpose of this method of flattening, which is to avoid a sharp angle right at a point of possible bending. In other words, it is considered desirable to have a better distribution of material at the point of bending.

One could build a simple truss with a single, continuous web member, following a design suggested by F. A. Weitzel, of Phelps-Dodge Corp. engineering department, and illustrated in Fig. 15. (In these sketches the welds have been omitted in order to show the fit-up more closely.) The web member is a tube which has been flattened at predetermined intervals, slotted and bent to form a web member in a truss. The upper chord members are T-sections made by splitting an I-beam diagonally. This produces a tapering chord which can easily be so proportioned that in each section between panel points such cross-sectional area is obtained as is required by the prevailing stress, thus reducing the over-all weight of the chord. Sometimes the center portion of the truss requires more material due to bending stresses; sometimes more material is needed toward the ends due to excessive shear.

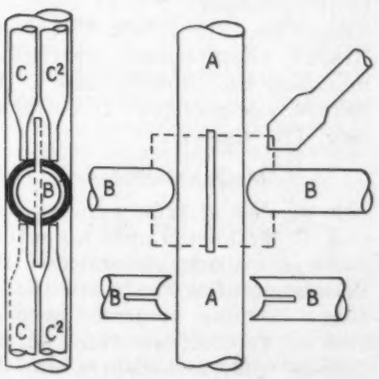


FIG. 12—This modification of the Mosley joint provides diagonal braces with an offset from the gusset to the horizontal member.

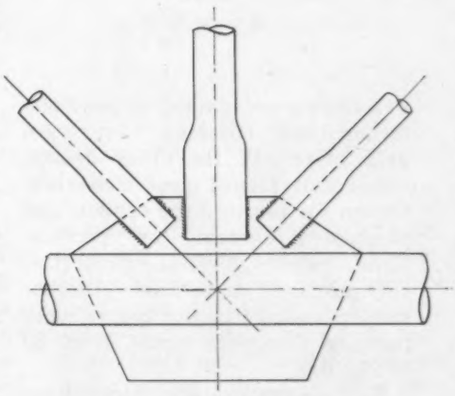


FIG. 13—In this design, developed by Vom Steeg, the gusset plate extends through the tubular chord member.

This joint is simple to fit and to weld, and has great resistance laterally. An interesting feature of the design is that it reduces the number of pieces in a truss to three, and the fabrication of these parts as well as the final assembly can readily be set up on a mass production basis, with only simple tools required.

These various methods of flattening round tubes for more economical joining are thought to be particularly attractive to designing engineers who wish to make use of relatively thin walled tubing on account of its high strength-weight ratio. The thinner the wall, the less power is needed for flattening. One has only to avoid diameter-to-thickness ratios that are too high. A D/t ratio in the range from 20 to 60 is generally satisfactory for structural purposes. Thanks to continued improvements and refinements of design in welding equipment the welding of the thin sections which would be encountered in the application of the suggested methods is no longer a problem.

There are undoubtedly other methods of designing flattened tube connections and other methods of avoiding the necessity for cutting profiled joints in order to use tubular members. It is a promising field of study for engineers with imaginations that need exercise.

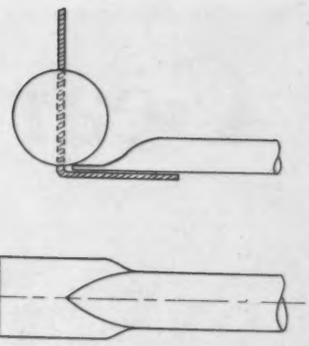


FIG. 14—Gusset plate bent at right angle to form horizontal connection to tubular chord. Detail of tube flattening is also shown.

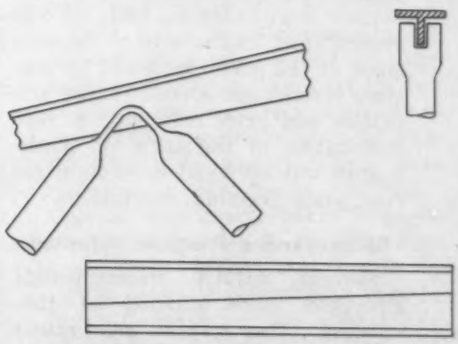


FIG. 15—In this design, the web members are formed from a single tube flattened at selected intervals and slotted. The upper chord members are T-sections made by splitting an I-beam diagonally as shown in the lower sketch.

Gear Makers Meet at Hershey

JOHN H. FLAGG
New President of American Gear Manufacturers' Association

• • • Mr. Flagg was born in New York City in 1898 and spent his early life in Hackensack, N. J. He originally prepared for a career in the U. S. Navy through an appointment to the U. S. Naval Academy. He was commissioned an ensign in 1917 and served overseas on escort duty. Following the Armistice, he entered Sheffield Scientific School, Yale University, and graduated in the class of 1920 with a degree in mechanical engineering. He has been connected with the Watson - Flagg Machine Co., Paterson, N. J., ever since and is now president of this firm.

° ° °

HOLDING of committee meetings on Sunday afternoon and the short-cutting of normal procedure in getting proposed recommended practices accepted by the association and into the hands of users bore out the feeling that "time is of the essence" as exemplified at the 26th annual meeting of the American Gear Manufacturers' Association, held at Hershey, Pa., May 10, 11 and 12. Sessions were carried on throughout the day and evening, leaving no time for golf or other sports activities usually associated with business conventions at resort hotels. Much was accomplished in the way of acceptance of Recommended Practices.

Commercial and technical sessions were held separately. The former were informal and "off the record" and had mostly to do with some of the problems posed by war time restrictions on materials, priorities and price ceilings. A representative of the OPA in Washington was on hand to explain recent price freezing regulations.

Recommended Practices Adopted

Several AGMA Recommended Practices were adopted at this meeting. One covered gear sound measurement and testing methods which tie in with the American Tentative Standards for Acoustical Terminology and Noise Measurement (ASA Z24.1 and Z24.2, 1936) and the American Tentative Standard for Sound Level Meters (ASA Z24.3, 1936). Two Recommended Practices were adopted on gear materials, one covering cast steel gear materials, the other drawn, rolled and forged gear materials. Except for limiting the sulphur and phosphorus content, the specifications cover physical properties only of these materials. Another Recommended Practice covers tooth parts of fine pitch gears, from 30 to 200 d.p.

The association also adopted revisions in a Recommended Practice for gear lubrication. This practice includes recommendations covering oils to use for parallel shaft reducers, planetary reducers, gear motors and spiral or straight bevel gears; for worm gears lubricated by oil, and the lubrication of open gears. The lubricants are identified by type and by trade name of the leading producers. Another Recommended Practice adopted covers the rating of oil field pumping units, and last, a Recommended Practice relating to gear proportions of industrial units was accepted.

New Officers

John H. Flagg, president of Watson-Flagg Machine Co., Paterson, N. J., was moved up from vice-president of the association to the presidency, succeeding Walter P. Schmitter, chief engineer of the Falk Corp. Russell C. Ball, president of Philadelphia Gear Works, Inc., was elected vice-president. Louis R. Botsai, manager of the Nuttall Works of Westinghouse Electric & Mfg. Co., was re-elected treasurer. Newly elected members of the executive committee are Thomas J. Bannan, vice-president, Western Gear Works, Seattle, Wash.; Douglas T. Hamilton, publicity manager, Fellows Gear Shaper Co., Springfield, Vt.; A. G. Kessler, vice-president, Farrel-Birmingham Co., Buffalo, and L. H. Shrade, vice-president, D. O. James Mfg. Co., Chicago.

McQuiston Feted

A number of tributes were paid to J. C. McQuiston upon his retirement as manager-secretary of the association after ten years of service. He was presented with a book of felicitations from all his friends and well-wishers in the gear industry, the gift of a wrist watch and a life membership certificate. He was also made the first recipient of the Edward P. Connell Award in recognition of his services to the advancement of

WALTER P. SCHMITTER
Retired as president of the AGMA

RUSSELL C. BALL
Vice-President of the AGMA

JACKSON C. McQUISTON
Was honored upon retiring as manager-secretary of the AGMA after 10 years of service.

---

the industry. The late Mr. Connell, long an active member in the secretary-treasurer of the Falk Corp. at the time of his death in February, 1941. Mr. McQuiston, for 30 years general advertising manager of Westinghouse prior to 1932, has been active in the affairs of the association since its formation in 1917.

Mr. McQuiston is succeeded by Newbold C. Goin, whose business career has also been mostly with Westinghouse. He served as field superintendent in the service department for four years, 14 years in the steel mill sales division and four years as sales manager of the gearing division of the Nuttall Works. Mr. Goin is a veteran of World War 1 having served 13 months overseas in the Signal Corps, finishing in the capacity of master signal electrician. He resides in Pittsburgh.

Skills and Satisfactions

Knowledge, dexterity and the ability of adjusting oneself to meet changing situations are the three principal factors for success in any work, according to Dr. Lillian M. Gilbreth, president of Gilbreth, Inc., professor of management at Purdue University and professor of personnel relations, Newark College of Engineering. Mrs. Gilbreth, most famous woman engineer in the country, was the principal speaker at the banquet. Speaking on "Skills and Satisfactions" she divided skills into five areas—handling of materials, handling machines, handling memoranda (paper work), handling men and handling money. She attributed the very successful work being done today by farm boys in metal working shops to the fact that they had become familiar with handling machinery of all kinds on the farm.

Listing the principal satisfactions on the job as money, prestige, titles, etc., she distinguished quantity people from quality people. The former like to see their work pile up in front of them; only then do they think they have accomplished something. Quality people are perfectionists and are totally unhappy in jobs where quantity is the goal. Some type of workers, on the other hand, enjoy highly repetitive types of operations and work best when certain rhythms are set up, sometimes by playing records. They are totally unhappy when the routine is changed.

Symposium on Gear Production

A highlight of the technical sessions was a symposium on gear production. In a paper prepared by L. W. Falk, executive engineer of the Falk Corp., and read in his absence by G. P. Maurer of the same firm, the hobbing of large mill and marine gears was described. The demands for this type of high speed gearing have been so large that Falk Corp. has ben obliged to modernize old hobbers that have been out of service for some years. Gear trains of these machines have been redesigned, more modern types of bearings installed and improved drive shafts and connecting means provided. Because of these drastic changes in the design of old equipment, it has been possible to increase materially the output of these old machines and at the same time to obtain greater accuracy and improved surface finishes.

Like many other manufacturers of large gear sets, Falk Corp. has built most of its own hobbers because in the beginning there were no commercial models of these sizes available. In general, Falk machines have been "over designed," that is, built overly heavy to make the performance of the machine steadier in taking heavy cuts in coarse pitch gears without straining. Considering the useful life of the gear hobber, the extra cost involved in insuring that it will have adequate "beef" for any cutting job is infinitesimal compared with the advantages obtained.

Falk has always favored horizontal work spindle machines for pinion cutting and vertical ma-

chines for large gears, which may weigh up to 30 or 40 tons. With the exception of several small pinion hobbers, all the machines are double headed types, because more metal can be removed in a given time by having two hobs cutting simultaneously.

Touching on the speeding up of cutting operations on large gears, Mr. Falk indicated that inspection standards had been relaxed somewhat so that noisy operation of gears is not so important a factor as long as they run smoothly together. By increasing speeds and feeds of hobbing, it has been possible to decrease cutting time as much as 15 to 20 per cent. To date, careful observation of the amount of correction needed in the subsequent lapping operation has failed to reveal any noticeable sacrifice in gear cutting accuracy due to speeding up of cutting. One of the discussers of his paper indicated, however, that saving three days' time in cutting was valueless if the gear sets had to wait around three weeks to get through the test stands, which are a potential bottleneck. It takes 1000 hr. on the average to cut the gears for an 8500-hp. merchant ship drive, this speaker stated.

A. A. Ross of General Electric Co., in discussing Mr. Falk's paper pointed out that his company had also designed its own large gear hobbers, of 200-in. capacity. Although gears of that diameter have never been made, the machines have been designed purposely oversize in order to reduce any spacing errors in the index wheel. The latest machines to be installed are of the double head type. Mr. Ross indicated that a great deal of attention is being given to the annealing of welded gear blanks because otherwise, as soon as the gears are loaded on the test stands, residual strains are released, the gear teeth are distorted and the gear set becomes noisy in operation. The building in which the gears are cut is well insulated so as to minimize temperature changes in the cutting room as compared with temperature changes outside during the day and night. The plant is not truly "air conditioned."

The method of shaping double helical gears with continuous teeth (herringbone gears without a center gap) with Farrel-Sykes gear generators was explained by H. E. Kitchen of the Farrel-Birmingham Co., Inc. Two individual cutter heads are used, independently controlled because one cutter is relieved on its return stroke when the other tool is cutting. Cutters are pinion shaped and the desired helix angle of the teeth generated is governed by guide sleeves with helical grooves cut in them. Work is mounted on a horizontal axis. With this type of equipment, it is also possible to cut two gears of different pitch diameters and numbers of teeth, provided there is a small gap between them. The machine will cut internal gears as well as external, and double helical racks.

NEWBOLD C. GOIN
New Manager-Secretary of the AGMA

Generation of Shaped Parts

A number of examples of the application of the Fellows gear shaper machine to the generation of unusual gears and other odd shaped parts was presented by George H. Sanborn, sales engineer of the Fellows Gear Shaper Co. Most of the examples were taken from recent applications in the aircraft industry and included engine cams, clamps for aircraft propellers, profiled ends of connecting rods, taper serrated spline members, propeller hubs, thread cutting, hourglass steering worms, involute splines and cams on a long camshaft. He also showed how a gear shaper can be easily converted from a generating machine into an automatic slotter to produce a coupling for an airplane engine.

Physics of Metal Cutting

With the aid of some microscopic high speed motion pictures, Dr. Eng. Mario Martellotti, research engineer of the Cincinnati Milling Machine Co., illustrated the action that takes place when tools cut metal. Disproving the popular conception that metal actually splits ahead of the tool point like wood, his film showed that the chip sluffs off due to failure of the metal under compression and shear loads. The shear angle is ahead of the tool and its magnitude is governed largely by the back rake of the tool and the friction of the chip against the tool face. The coefficient of friction is related to the cutting fluid used.

Particularly when machining soft steels, Dr. Martellotti pointed out, owing to the high friction between the compressed chip layer and the tool face, a part of this layer usually remains anchored to the tool face to form the so-called built-up edge. Because portions of this built-up edge break off and adhere to the work, a ragged surface is produced. If carbon tetrachloride is introduced as a cutting agent, chip friction is greatly reduced and the built-up edge disappears. The anti-friction properties of this chemical are due to the formation of chlorides of iron or other metals on the tool and chip face. Unfortunately, this chemical is volatile and its fumes are toxic, so that it is not commercially practical.

Dr. Martellotti also showed that the built-up edge effect may be eliminated by supercooling the work. Experiments on aluminum indicated that aluminum if cut dry at 200 deg. F. will show a rough surface, but a great improvement in finish is obtained when the same piece is machined at—60 deg. F.

With a milling cutter a built-up edge is also produced, but since it takes a definite period of cutting before the edge is formed, roughness due to this cause occurs only at the end of the cutting arc. Hence, conventional "up" milling gives a smoother surface than "down" milling because of the position of the end of each chip in relation to the final finished surface.

New Equipment . . .

Plant Service Apparatus

Six of the items in this week's news are designed to protect workers from various industrial hazards, the others are intended to contribute to plant safety and efficiency.

ONE out of every four industrial accidents injures someone's feet or toes. To afford the 4,000,000 women in industry the same protection offered to men, the *Lehigh Safety Shoe Co.*, Allentown, Pa., has styled a line of Toe-Shield

shoes for women. Protection against injury from the type of tools or materials normally handled by women is provided by a thermoplastic toe guard concealed under the leather toe cap. Only one style is offered, in black elk or calfskin, built on a nurse's shoe last.

Incandescent Lamp

A CERAMIC glass-on-glass coating on a new series of lamps made by the *Save Electric Corp.*, Toledo, is said to give glare-free light. The coating, called Verd-A-Ray, passes less red and more green-yellow rays. The bulbs, which are available in sizes from 40 to 1500 watts, can be used in any incandescent lamp socket.

Fluorescent Lamp Improvement

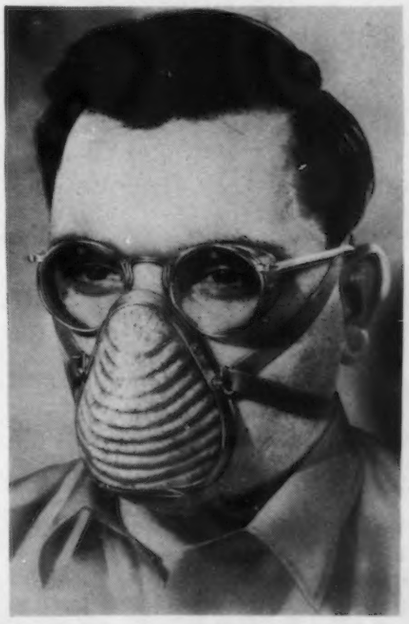
EXPLAINING that fluorescent lights require an exact amount of mercury for optimum results, engineers of *Hygrade Sylvania Corp.* claim to have developed a process which increases lamp life and initial brilliance. It is also said to eliminate subsequent development of dark streaks and splotches. The basis of the process is the explosion of a mercury "bomb" in the tube during manufacture, thereby regulating exactly the amount of mercury in the lamp.

Dermaiitis Preventive

INDUSTRIAL dermatitis or skin disorders caused by bacterial or fungus infestations in cutting oils, drawing oils and similar compounds is claimed to be prevented by the addition of a water soluble germicide in tablet form. The tablets, a product of the *Natriphene Co.*, Book Building, Detroit, are dissolved in emulsified oil or alcohol and this solution is added to the cutting oil base before dilution with water.

Respirator

FOR protection against toxic dusts, the *American Optical Co.*, Southbridge, Mass., is introducing a new type of respirator. The device is light in weight and gives full vision, though the entire face piece is a filter. Approved by the U. S. Bureau of Mines for protection against toxic or poisonous dusts, it is fitted with a rubber sealing piece and a non-reversing exhalation valve. The respirator weighs 1½ oz., and offers protection against the dusts of lead, cadmium, arsenic, chromium, manganese, selenium, vanadium and their compounds.



Grinder's Gloves

A MITTEN type hand guard has recently been designed by the *Industrial Gloves Co.*, Danville, Ill.

The guard is made of chrome tanned cowhide with a steel reinforced leather patch on the back, and seams are stitched with steel thread. It is designed for wear over regular gloves or mittens. The company also offers a line of open end chippers gloves which are insulated against heat with a woolen pad.

Asbestos Suit

INSTANT and complete personal protection against flame hazards in emergencies is provided by a new one-piece asbestos suit, ac-

cording to the manufacturer, *Mine Safety Appliances Co.*, Pittsburgh. The helmet is a laminated bakelite protective hat, covered with asbestos, and fitted with a heat resistant glass window. Slide fasteners, protected against heat, are said to permit quick access, and flannel linings guards against chafing. The combination of helmet, gloves and boots into a one-piece garment completely encloses the wearer and prevents the entry of flame.

Chemical Sprinkler

AN automatic chemical fire extinguisher developed by the *Bancroft Chemical Sprinkler Co.*, Worcester, Mass., is designed for installation in hazardous locations where ample city water is unavailable. It is also claimed that its vaporizing chemical will extinguish magnesium fires. The units are built in small sizes for protection of boiler rooms and stairways, and in larger models for blanketing an entire plant area.

Steel Work Bench

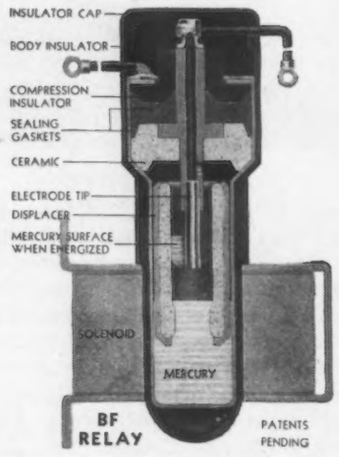
SEVERAL new accessories have been added to increase the usefulness of the steel work benches manufactured by *Lyon Metal Products*, Aurora, Ill. One, two or three drawer units may be added to the basic bench for multiple shift operation, and shelves, back and end stops and a foot rest or full length bench riser can be included.

Air Conditioning

INDUSTRIAL applications of air conditioning have shown a marked increase since the country's war effort got under way. It is said that many industries have found it the quickest and easiest way to speed up production, and output gains of from 5 to 20 per cent are reported. In metal working plants it helps prevent rust and corrosion, and, by maintaining constant temperatures, makes closer tolerances possible. According to officials of *Chrysler Airtemp Division*, the "packaged" unit, which permits the cooling of selected rooms, is one of the most popular types because it is a completely self-contained unit, requiring little or no duct work.

Mercury Relay

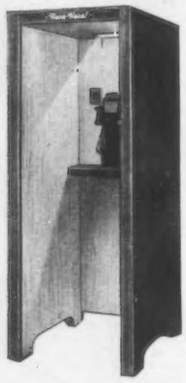
A QUICK acting solenoid operated relay in which the circuit is made and broken in a hermetically sealed chamber is announced by *Durakool, Inc.*, Elkhart, Ind. The sealed chamber contains hydrogen under pressure. When the coil is energized a plunger is pulled down, displacing mercury contained in the bottom of the chamber. Arcing and pitting are



said to be eliminated in the new unit which has particular application in places where the danger of explosion is present. The unit is designated as the BF blackout relay because of the absence of brilliant arcing flashes.

Telephone Booth

NO priorities are required to obtain the industrial 'phone booth built by the Acoustic Division of the *Burgess Battery Co.*, 2825



W. Roscoe St., Chicago. The booth is made primarily of wood and uses no critical materials. The acoustic lining permits its use in noisy mills and factories without requiring a door, and conversation carried on in ordinary tones within the booth cannot be understood outside.

Dust Collecting Filter

THE *Aget-Detroit Mfg. Co.* is now offering an oversize cylindrical filter to replace the flat type now used on the company's "Dustkop." It requires no additional floor space, but has more than five

times the area of the standard flat filter, and is said to increase air speed velocity by 1500 ft. per min. without any change in fan or motor. The filter material is made of spun glass and is easily removed and replaced.

Ex-Cell-O Grants Pay Increase

A REVISED agreement with the UAW-CIO has been reached by Ex-Cell-O Corp. providing for a 10c. an hour wage increase for 6000 employees in the company's three Detroit plants. The union has estimated that the wage increase will cost the company $2,000,000 per year, with 10,000 expected to be employed in these these plants by fall.

Safety for a nation at war . . . The Army on wheels, like the army in overalls, depends on "A.W." Rolled Steel Floor Plate to prevent costly disabilities. Here is the right combination of underfoot protection and longest possible wear. "A.W." Floor Plate is fire-proof, heat-proof, oil-proof, crack-proof. Cleans easily, drains easily. Installed with minimum of time and labor.

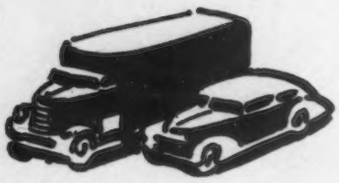
ALAN WOOD STEEL COMPANY

MAIN OFFICE AND MILLS: CONSHOHOCKEN, PA. District Offices and Representatives: Philadelphia, New York, Boston, Atlanta, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, Houston, St. Paul, New Orleans, Pittsburgh, Roanoke, Sanford, N.C., St. Louis, Los Angeles, San Francisco, Seattle, Montreal.

Courtesy U. S. Army Signal Corps

Assembly Line . . .

• Nash-Kelvinator Corp. affords insight into the size of the conversion job now engaging the automotive industry . . . Saturation point very nearly has been reached for entire industry.



DETROIT—The degree of actual conversion of automotive plants for war production is hard to visualize for a reader who may be half a continent away from the scene. The task of doing so is complicated by censorship regulations which wisely prevent the publication of data that might aid the enemy. But, by taking one of the smaller units of the industry and detailing some of the "safe" facts and figures, it may be possible to give an idea of the size of the conversion job, its progress so far, and ultimate results and effects, including post-war guesses.

A few weeks ago, in a censored speech, George W. Mason, president of Nash-Kelvinator Corp., told something of the role that this automotive-refrigerator concern is playing in war work.

"We have eleven separate manufacturing plants, located in four states, and a plant in Canada and one in England engaged in war work. One of these U. S. plants, which grew out of an unused warehouse, is producing hydromatic variable-pitch propellers for multiple-engined bombers. Soon there will be a second and larger plant engaged in this propeller work. In another plant we are preparing to build the world's most powerful motors that are designed to carry American fighting planes faster and higher than anything known to the enemies of this country. We have undertaken to build, in their entirety, huge aerial four-engined transport ships with new record-carrying capacity and cruising radius. We are also building secret war products upon which I am not at liberty to report. Our goal is to produce war material between three and four times as fast as our greatest peacetime year of production."

ALTHOUGH Mason disclaimed that his organization is "in any way unique," a little elaboration on his statements reveals some unusual and significant facts.

First of all, although it is one of the independents in the auto industry and, as such, a midget compared with any of the Big Three, Nash-Kelvinator has gone into the airplane business on a tremendous scale. It is the only one of the independents that has undertaken the manufacture of complete aircraft—its range of aeronautical activity covers the whole field from propellers to tail skids, and that, in itself, differentiates this company from others. Moreover, the aircraft engine assigned to this firm is more powerful, and probably more difficult to produce, than most of those being built by the industry today. It is an engine designed for extremely high-altitude flights. The biggest aircraft job will be the building of the flying freighters mentioned by Mason. These will be assembled at a point far-distant from Detroit, with complete capacity for parts to be installed in two separately located sheet metal plants operated in the past by Nash-Kelvinator.

All of this adds up to the fact that, a year from now, Nash will be producing goods at the rate of about $500,000,000 annually, compared with 1941 sales of $122,000,000. On this basis, the company is taking on the biggest proportionate increase in volume in the antomotive industry. Its employment of 20,000 men on production in 1941 will be scaled up to a peak two and a half times the previous high.

OBVIOUSLY, Nash-Kelvinator is loaded to capacity and cannot be expected to undertake very many more assignments, if any. In fact, it becomes increasingly apparent that the saturation level has very nearly been reached in the entire automobile industry, from the viewpoint of labor supply, if from none other. But the shortage of supervisory personnel runs neck and neck with the labor shortage as the ultimate controlling factor. It appears unlikely, however, that the problem of finding engineering talent will become much worse. It might even be guessed that when the peak of the load on designers and tool engineers is passed on present projects, these men may divert their talents to bringing out "new models" of present war items or assisting in licking technical problems elsewhere.

In contrast with Nash's four-to-one ratio in war-peace production rates, anything less seems like a let-down. However, even the fairly typical examples could have evoked gasps a year or so ago. Fairly typical is Briggs Mfg. Co., once noted as a builder of automobile bodies and plumbing and rolled sections. Now it is turning out aircraft wings, ailerons, wing tips, wing flaps, stabilizers, fins, rudders and tail assemblies, aircraft bulkheads, various aircraft door assemblies, including bomb bay doors, bomber duct assemblies, bomber turrets, shells, cartridge cases, tank hulls and aircraft engine parts. When this company reaches a full production level on its war contracts, its dollar volume rate will be more than twice its best peacetime rate.

Briggs' president, in a stockholders' meeting last week, reported on the 15 major war contracts held by the company. On one of the major wing assembly jobs he said the company was 39 per cent ahead of the required schedule at the end of April. On another wing section job, it was 38 per cent ahead. Still another complete wing contract was 13 per cent ahead of schedule and another war mechanism was 20 per cent ahead of schedule. The company has managed to make use of 80 per cent of its press shop equipment, either on actual war work or designated for such jobs.

WPB has recently made available some information which makes possible some very interesting descriptions and comparisons of major pieces of military equipment now being made in this area. According to this information, 30 to 50 per cent of the weight of any military tank is armor plate. In a light tank are 14,000 individual

Tapping Trouble?

CHECK THESE POINTS

If your taps are breaking, or not cutting smooth, proper size threads, it may not be the taps' fault. Here are a few things to check to help you locate and correct tap trouble

TYPE OF HOLES TO BE TAPPED

If a blind hole, is there sufficient untapped space at the bottom for the accumulation of chips?

Is a "Gun" tap that shoots the chips ahead being used? (In a blind hole tapped very nearly to the bottom and having no recess, the "Gun" tap is not recommended.)

Do conditions call for a two or three fluted tap?

CLASS OF FIT REQUIRED

If the tap produces an oversize hole, has the proper tap been selected for the class of fit desired?

If proper tap is being used, is there any play in the work or tap holding spindles (provided rigid spindles are being used)?

Do the work and tap line up accurately?

Is the tap dull?

TYPE OF MACHINE

Is drive uneven because of slipping belts?

Is machine powered properly?

Are tap and drilled hole in alignment?

Is there undue wear on sliding parts?

TAPPING SPEEDS

Is the speed too slow?

Is the speed too fast?

TAPPING DIFFERENT MATERIALS

Has the tap proper cutting face for the particular material being tapped?

Is the tap of the proper design or type?

This is one of a series of advertisements published by the Greenfield Tap and Die Corporation to help users get greater production from their taps. The entire series is now available in booklet form. Send for a copy.

PROPER HOLE SIZES BEFORE TAPPING

Is the drilled hole of the proper size?

Is the drilled hole perfectly round?

Is the axis of the hole parallel to the axis of the tap?

LUBRICATION

Has the proper lubricant been employed?

Does the lubricant flood the tap sufficiently while engaged in the hole?

Is there sufficient force behind the lubricant to wash away the chips?

If applied with a brush has the lubricant a sufficiently heavy body to adhere to the tap? (A light lubricant will be thrown off the revolving tap before it enters the hole.)

TAP HOLDING DEVICE

Is worn or wrong type of holder being used?

Is holder in alignment with drilled hole?

CHAMFER

Is the point diameter of tap correct for the size of hole being tapped? Does the tap enter the hole an excessive number of threads before taking hold, thereby losing the full benefit of the entire chamfered portion?

Is the chamfer the correct length?

Is the chamfer chipped or dull and in need of regrinding?

Is the chamfer relief too great or not sufficient?

"Maxi" Tap, for abrasive metals
"Gun" Tap for through holes in stringy metals
Standard Tap for average production operations

GREENFIELD TAP AND DIE CORPORATION
GREENFIELD, MASSACHUSETTS
DETROIT PLANT: 2102 West Fort St.
WAREHOUSES in New York, Chicago and Los Angeles
In Canada: GREENFIELD TAP & DIE CORP. OF CANADA, LTD., GALT, ONT.

GTD GREENFIELD

TAPS · DIES · GAGES · TWIST DRILLS · REAMERS · SCREW PLATES · PIPE TOOLS

pieces, in a medium tank 25,000 pieces and in a heavy tank 40,000. The cost of modern tanks is $1.00 a pound (with weight running up to 112,000 lbs.) compared with a cost of 20 to 24 cents per pound for mass-produced automobiles.

THE potency of a name and the weight of an idea are aptly illustrated in reports that guerrilla bands fighting Hitler in Europe are all agog over the launching of real mass production of war goods. The names "Detroit," "Ford," etc. and the assurance in the minds of millions that these words mean miracles of mass production, may play some part in the outcome of the war—possibly a greater part than can be measured here or now. By the same token that these words and ideas spur the morale of those fighting Hitler and the Japanese, these same words and ideas may shake the cocksureness of the dictators. The world may shortly hear some of the startling reports of Detroit's progress in war production flung broadcast with these objectives in mind.

Typical is the censor-approved Army release last week-end "Ford now in production on bombers." This is almost a case of censorship working backwards.

Subtly there may be much news of war production that will parallel the blunt but heartening words of Buick's recent "Listen to this, enemies of America . . . We've stolen a year's march on the Axis. Right now we are building airplane engines at the rate we were expected to hit in late spring, 1943, . . . All of which we thought you ought to know in case you are revising your timetable."

The progress in the conversion of Michigan's furniture industry—largely centered at Grand Rapids—to the production of war goods is reported. These woodworking plants will make parts for airplanes, gliders and vessels instead of furniture, and various other units of the industry will turn out ammunition boxes, airplane fuel lines and other military requirements. The industry in normal times produces metal and wooden furniture valued at about one billion dollars annually, second in dollar value of consumer goods only to the automobile industry. Up to date prime contracts and sub-contracts held by this industry exceed $500,000,000 so it can be said to be about 50 per cent along the path required to make use of all of its facilities. It is expected to reach the billion dollar war production rate by the middle of next year.

Virtually completed, the $25,000,000 plant of the American Propeller Co. at Toledo, was scheduled for preview and flag-raising ceremonies on Wednesday (May 20) many weeks ahead of schedule. The plant will produce hollow steel propeller blades from seamless tubing. Aviation Corp. is the parent company and William F. Wise, executive vice-president of Aviation Corp., is president of the propeller company.

Where are the dies of yesteryear? Well, in many cases they are being packed away in stout pine boxes piled tier on tier in abandoned buildings, dingy warehouses and even big tar paper shacks built in a few days. The "Chrysler War Works Magazine" reports that the various accessories—tools, dies, jigs and fixtures—used on its 15,000 to 20,000 machines for auto production have been padded away in this manner. The value can hardly be calculated but, it is pointed out, in one year Chrysler spent $12,000,000 to retool on just one model.

Detroit A.S.T.E. Hears Talk On Welding by E. W. P. Smith

Detroit

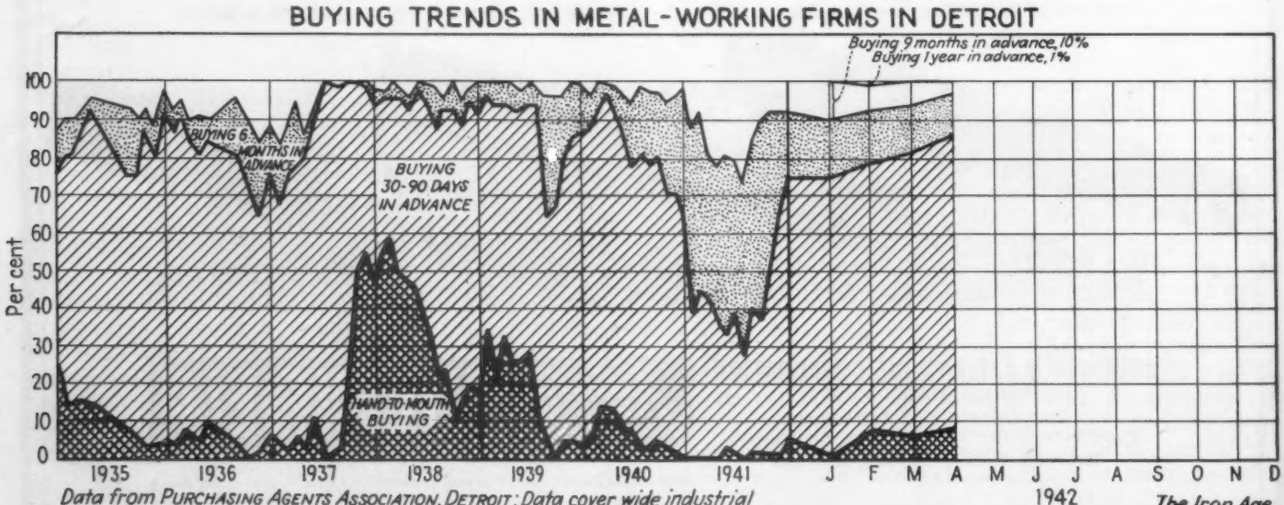
• • • **Details of** modern welding practice were discussed May 14, by E. W. P. Smith, consulting engineer of the Lincoln Electric Co., Cleveland, in an address before the American Society of Tool Engineers, Detroit Chapter. The physical characteristics of cast iron and steel, and the use of welding materials were summarized, and the Fleet-Fillet method of welding described. The use of polarized light and celluloid models, as an aid to cost reduction in welding design and practice was also discussed.

Aluminum Plant for N. Y. Area

Washington

• • • **WPB has approved a 10** pot line bauxite plant to be constructed by the Aluminum Co. of America in the New York area. Approximately 30,000,000 lb. annual production is expected.

BUYING TRENDS IN METAL-WORKING FIRMS IN DETROIT



Data from PURCHASING AGENTS ASSOCIATION, DETROIT; Data cover wide industrial field, including stove, refrigerator office equipment, steel, auto parts, accessory, auto plants, and all armament materials

IT TAKES *Less Time* TO GET T & W FORGINGS ONTO THE ASSEMBLY LINE

INSOFAR as a material unit, such as a forging, can expedite the production of war implements, T & W Forgings are hastening, in a slightly greater degree, the assembly of aircraft, tanks, armored cars, trucks, anti-aircraft guns, naval equipment and a wide variety of fighting armaments.

From T & W Forgings you may obtain the utmost of every advantage that a forging offers, and find a way to produce more armaments at a faster rate. Specifically, T & W Forgings offer these advantages:

They conserve critical materials because they are forged to close tolerances.

They reduce time required for machining and finishing because there is less excess metal to remove.

Each T & W Forging can be machined and finished at a faster rate and at lower cost.

T & W Forgings decrease scrap because they are unusually free of concealed defects.

Fewer rejects out of any lot of T & W Forgings conserve metal—avoid waste of production facilities.

Forgings for armaments now engage all of the engineering and production facilities of the T & W organization. Nothing is allowed to limit the attainment of the utmost production in the shortest possible period of time. T & W Engineers are continually striving to discover ways and means for stepping up the production of forgings and the maintenance of quality standards that reduce inspection time. Ask a T & W Forging Engineer about these methods.

FORGINGS

USUALLY COST LESS AT THE POINT OF ASSEMBLY

TRANSUE & WILLIAMS STEEL FORGING CORPORATION

ALLIANCE, OHIO

SALES OFFICES: NEW YORK • PHILADELPHIA • CHICAGO • INDIANAPOLIS • DETROIT • CLEVELAND

Washington . . .

• Some observers hold that enforcement of General Maximum Price Ceiling will be next to impossible even though thousands of watchdogs are hired . . . If not enforced, lawlessness will be encouraged.

WASHINGTON — From the President and OPA Price Chief Leon Henderson down to the lowliest Government subordinate, the country has been warned that unless prices are frozen and monetary relations are stabilized through the combination of heavier taxation, credit restriction, and interest and wage control (even though moderate) the United States will be overwhelmed by financial disaster, with disagreeable results to the war effort. If this is true the iron and steel industry and all metal working industries not directly under the general freeze order issued early this month will be affected by the success or failure of the price control venture.

Far from being convinced that price control attempts might be likened to an effort to repair a broken casting on the biggest machine in the shop with a tiny welding machine, Washington economists, outwardly at least show no doubt that the general freeze will work.

The economists who subscribe to the first premise and talk in terms of the "inflationary lag" between available goods and buying power say that all American business is organized so tightly and is so interrelated that the sale of a loaf of bread in California and the soling of a pair of shoes in Maine are important impingements on every other daily transaction. This is called the "molecular theory" which is illustrated by the example of the stone dropped in a stream which causes ever widening ripples and eventually agitates every molecule or drop of water in the world. Apparently, though, these business prophets further than this, do not appreciate the magnitude of the job they have undertaken.

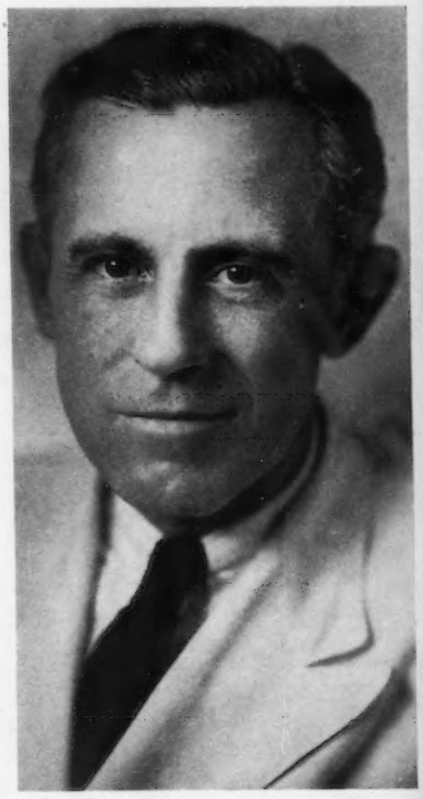
THE main argument is that it is illogical to suppose that since man has invented machines and ways of doing business, he cannot thereafter direct them to advantage.

Let's take a look at the "record." OPA itself has estimated that there are approximately 135,000,000 business transactions daily. If OPA receives requests for adjustment up from the retail level (OPA insists there will be no upward revision of retail prices) from wholesalers, manufacturers and others to adjust one-tenth of one per cent of these dealings, it will have to process 135,000 requests daily. And where will it get the huge staff competent enough to do the job fairly?

According to the Business Census of 1940 there are in the United States 1,770,000 retailers, 646,000 establishments engaged in personal and other services, 201,000 wholesalers, 184,000 factories, 60,000 mining units, and 215,000 construction concerns. All will be subject to the general price freeze to a greater or lesser extent.

THE OPA is undertaking the job of making adjustments of inequities under the ceiling. Cases of severe hardship already have arisen. OPA admits that many of the issues raised require answers that it does not have now. And unfortunately, OPA is not composed of enough business men to do the job properly. There are many whose experience has been solely governmental or academic only. College professors, as price executives, abound. Mr. Henderson himself has no real business background.

Frequently in a free market the distributing setup must undergo myriads of adjustments throughout the country. These adjustments are made by the parties on the spot.



Harris & Ewing Photo

DEPUTY CHAIRMAN OF WPB: Fowler Harper recently was appointed deputy chairman of the War Production Board.

The price ceiling stands before any contract.

Therefore, consider the plight of the wholesaler whose maximum price during March was carefully calculated on a short profit margin. He sold to retailers at the most advantageous price in the market. Assume that he goes to his supplier hereafter and attempts to hold him to the highest price he was charged during the freeze month. The supplier quite rightly and within the law could say "I charged persons of your 'same class' during March higher prices than I charged you. Therefore, I am entitled to receive hereafter that higher price as my legal maximum."

SOME observers say that enforcement will be next to impossible, even though OPA hired price watchdogs equal in number to the business establishments in the country. The reason is not that American business is unpatriotic,

Better Guns · More Guns · *Faster!*

SUNICUT NEARLY DOUBLES PRODUCTION

Increases Tool Life 60%

Guns and more guns is the aim of America today — produce better guns . . . more guns . . . faster! That's exactly what one munitions manufacturer achieved when he called in a Sun Oil Engineer . . . one of those Doctors of Industry.

A change was made to Sunicut, the free-flowing, transparent sulphurized cutting oil, on machines producing parts for anti-aircraft guns. The improvement was noticeable almost immediately. Tool life increased 60% . . . finish was improved . . . and the output of vitally needed parts boosted from 2½ pieces per eight hour shift to almost 4½ . . . nearly doubling production.

That's another typical example of how Sunicut and Sun Oil Engineers are helping America step up production for victory!

Throughout the war industries . . . wherever metal cutting problems arise . . . *Sun's Doctors of Industry* and this extraordinary cutting oil stand ready, willing and able to help. Call on them to improve production in your plant. For helpful case histories of what they have accomplished in other leading metal working plants, write for your free copy of "Helping Industry Help America."

SUN OIL COMPANY • PHILADELPHIA

Sponsors of the Sunoco News Voice of the Air—Lowell Thomas

SUNOCO

SUN PETROLEUM PRODUCTS.. HELPING INDUSTRY HELP AMERICA

but if Washington bungling starts to kill off their livelihood, the threat of bad press or criminal prosecution will not put a stop to the desire for profit.

If the price law is rigidly enforced, it will take the all-out suppression of a totalitarian state to do it, and if it is not enforced, it will encourage lawlessness and disrespect for the Federal government. The same experience was encountered in the enforcement of the prohibition laws. If Congress makes laws and permits regulations under them so contrary to human traits, they may expect nothing but fiasco.

When business men see that violations are general with little or no enforcement, violations may become flagrant. That all government depends upon proper executive force is axiomatic. If there is no real enforcement, it is not unreasonable to say that the program must fail.

So far as the rest of the anti-inflation plan is concerned—the taxation, and credit controls, etc.—economists think they are sure of the causes of inflation or depression. But none can exactly agree on just what they are.

On the question of taxes, Congress is trembling, and Barkis is not willing this time. . Congress knows that the elements of national bankruptcy were present before the war with a heavily unbalanced income and outgo.

The war has upped the public debt to fantastic proportions and Congress in its wisdom had not seen fit to impose taxes sufficient to carry the burden of government costs, during the prewar period. Taxpayers are now expected to pay until it hurts, not only for the expense of carrying on the war, but to compensate for eight years of boondoggling. There is a great reluctance throughout the land to pay for those halcyon years of "eating cake."

With the administration courting labor, and only making half-hearted passes at wage and farm product stabilization, the price fixers have a swell excuse if the lugubrious thing doesn't work. And some folks think a horrid flight of currency is on the way, Henderson or no Henderson.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

I STILL THINK I'VE BEEN OUT OF TH' GAME TOO LONG TO COME BACK TO IT AT MY AGE!
OH, NO, ALEC--WE NEED YOUR SKILLED HELP BAD AT A TIME LIKE THIS! YOU'LL FIND THINGS HAVE CHANGED SOME!
WHUT ARE THEY DOIN'? BRINGIN' 'EM BACK OFF TH' SHELF SO OLD THEY HAVE TO HOLD 'EM UP!
I WAS JUST WAITIN' TO SEE HIM TAKE HIS HANDS OFF THE OL' BOY! "THINGS HAVE CHANGED SOME"! ENOUGH SO HE'LL HAVE TO LEARN TH' TRADE OVER AGAIN! HE'S FORGOT MORE'N WE EVER KNEW, BUT IT'S BEST FORGOTTEN NOW!
SUPER SERVICE RADIAL
J.R.WILLIAMS
THE SHELF ROBBERS
T. M. REG. U. S. PAT. OFF. COPR. 1942 BY NEA SERVICE, INC.
5-22

New Office Will Survey Separate Units of WPB

Washington

• • • **Dr. Luther Gulick** has been named by WPB to direct a permanent office of organizational planning, it was announced last Thursday. At the same time, Lounsberry S. Fish was appointed assistant director of the new office.

The new office will study responsibilities and operations of the separate units of WPB. It will search for possible duplication and overlapping of functions.

Dr. Gulick comes to this assignment from the War Department, where, as consultant to the Secretary of War, he has served under Lieutenant General Somervell on supply organization problems.

A. S. Shafter, secretary-treasurer of the United States Mfg. Co., Decatur, Ill., has been appointed special assistant to Philip D. Reed, chief of the WPB Bureau of Industry Branches.

C. M. Wilcox, Washington, D. C., has been appointed chief of the newly created plumbing section of the WPB Plumbing and Heating Branch. Mr. Wilcox recently had been on the staff of the OPA Standards Section for which he prepared standards on plumbing. Previously he was a mechanical engineer in the War Department.

War Dept. Approves Indiana Depot, Six Other Contracts

• • • **The War Department** announced May 12:

1. Authorization for the construction of a depot warehouse in Indiana, to cost in excess of $3,000,000. Construction will be supervised by the Detroit district office of the Corps of Engineers.

2. Authorization for the expansion of the O'Reilly General Hospital, Springfield, Mo. Construction will be supervised by the Kansas City district office of the Corps of Engineers.

3. Authorization for the construction of a depot warehouse in New Jersey, to cost in excess of $3,000,000. Construction will be supervised by the New York district office of the Corps of Engineers. A contract for construction management services has been awarded the Duffy Construction Co., New York.

4. Award of a contract to Ellerbe & Co., St. Paul, for architectural-engineering services in the construction of an Air Force installation at Great Falls, Mont., to cost in excess of $3,000,000. Construction will be supervised by the Fort Peck, Mont., district office of the Corps of Engineers.

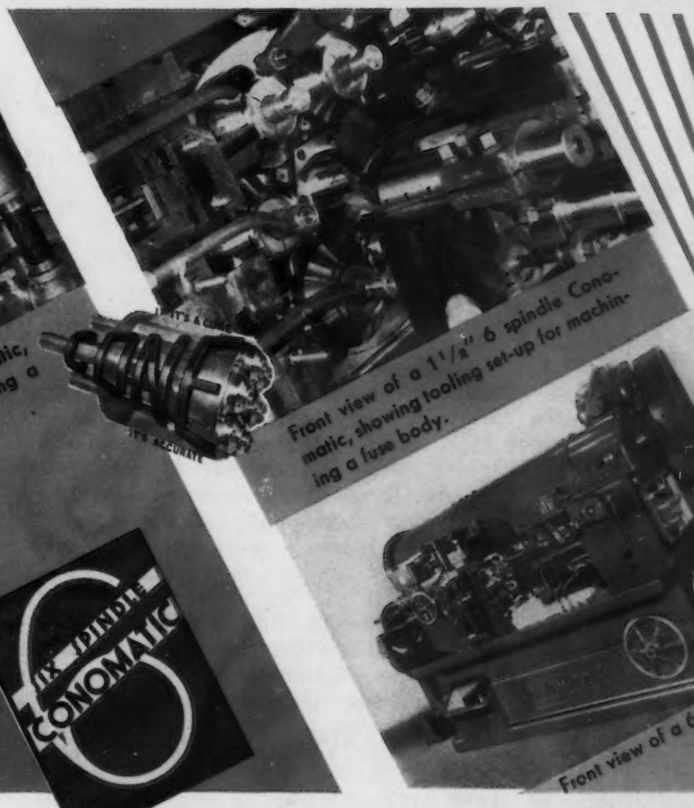
5. Authorization for the construction of an Air Force training school at Stuttgart, Ark., to cost less than $3,000,000. Construction will be supervised by the Little Rock district office of the Corps of Engineers.

6. Award of a contract to Britsch & Munger, Toledo, for architectural-engineering in the construction of a depot warehouse in Ohio. Construction will be supervised by the Columbus district office of the Corps of Engineers.

7. Authorization for the construction of an Air Force installation at Casper, Wyo., to cost in excess of $3,000,000. Construction will be supervised by the Omaha district office of the Corps of Engineers. A contract for architectural-engineering services has been awarded Toltz, King & Day of St. Paul.

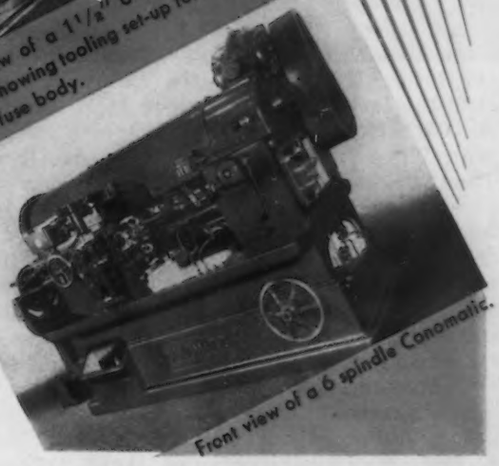
United Speed and Action with Conomatics

Rear view of a 1 1/2" 6 spindle Conomatic, showing tooling set-up for machining a fuse body.



Front view of a 1 1/4" 6 spindle Conomatic, showing tooling set-up for machining a fuse body.

Write NOW for particulars and catalog.



Front view of a 6 spindle Conomatic.

Cone AUTOMATIC MACHINE CO., INC.

WINDSOR, VERMONT, U. S. A.

WEST COAST . . .

• Far West races to get iron and steel scrap in sufficient quantities to keep production up . . . Ill-fated Tacoma Narrows Bridge scrap ordered sold . . . Building of wooden ships being studied closely.

SAN FRANCISCO—Steel production on the Pacific Coast has developed into a race to bring new pig iron capacity into production before the temporary stimulus of non-recurrent scrap is exhausted.

Operating, with one exception, close to 100 per cent with scrap, the mills have used up normal local supplies, and have had to reach out as far as Hawaii, Canada and inland states to obtain material for capacity operation. So far, operations have not been curtailed. Remote scrap has been available in sufficient quantities, but the outlook for the future is clouded by the fact that this extra scrap, acquired at such difficulty, is mostly non-recurrent. When it is gone, it is gone. Then, unless pig iron can be secured either from local or eastern sources to provide a balanced charge with recurrent scrap, curtailment may be necessary.

Through a break-neck construction program, one new far Western blast furnace may be blown in next January, seven and one-half months from now. Although no one can say definitely how much non-recurrent scrap can be obtained, the industry will be relieved if it lasts more than six months more. Next winter may bring at least a few weeks of famine.

Despite this unencouraging outlook, the picture currently is brighter than it has been. The WPB Bureau of Industrial Conservation has put forth much effort to thaw out dead scrap particularly in remote mountain territories. This has been of benefit. On the other hand, full credit must be given to those who have helped their own cause by unprecedented scouting activities.

IN the first eight weeks of its operation, the Industrial Salvage Unit of the Bureau of Industrial Conservation calculated that 88,923 tons of iron and steel scrap had been sent to the mills and foundries through its efforts in the 10 Western states. Activities of the Industrial Salvage Section in the Far Western region have parallelled those in other sections of the country where industrial concerns have been called on to push salvage activities within their own organizations, but perhaps its most productive work here has been in stimulating the flow of scrap from the mining and logging industries. The aid of the United States Forest Service has been enlisted to survey abandoned and inactive mining properties so that long idle producing and milling machinery may enter scrap channels. One ghost backwoods railroad contributed 33,000 tons of scrap at one crack when it was induced to break up old gondolas which would never be used again. Mining scrap is particularly welcome, for it serves to sweeten the low grade material flowing in from other sources.

In addition to stimulating the flow of prima facie scrap some of the bureau's most successful activity has been in persuading owners to junk machinery which they had been holding on to with view to possible future use. Even though some of this tonnage is salvaged and does not show on scrap records, it helps to release the pressure screws on the demand for new equipment.

Of all the scrap obtained through the Industrial Salvage Section's efforts in the 10 Far Western states, about 75 per cent consistently comes from California. No figures are available from the automobile graveyard section, but it is a safe guess that a similar percentage obtains in its activities.

AS the automobile graveyard program swings into action, it is providing a temporary bulge in material, but the future activities of this section will be reflected to a greater extent in keeping graveyard inventories reduced and turnover rapid. Graveyard owners, at first skeptical as to whether they could profitably cooperate with the program under OPA scrap ceilings, are now reported to be displaying a more friendly attitude. At the outset, the auto junking program means that the graveyards have to change their way of living. No longer can jalopies be allowed to remain at pasture indefinitely while being picked apart piece by piece as customers call for particular used parts. To make a livelihood under the government program, graveyard owners will have to disassemble the cars on a "production line" basis, salvaging parts only in proportion to demand and turning the carcasses over to scrap dealers en masse. By increasing turnover, and thus reducing capital tied up in stored jalopies, the government is selling the graveyard owners on the idea that they can still make a profit. Labor for this type of work is not as abundant as in the past, but, on the other hand, even defense workers are willing to make a few extra dollars in off-hours as long as there are no union conflicts.

Even recalcitrant graveyard owners must face the fact that the market for used parts is becoming slimmer and slimmer as aged automobiles leave the highway in rapidly increasing numbers because of rubber and other restrictions. Months from now, when the stream of industrial scrap begins to dry up, it may be the increased rate of automobile junking that turns the tide until pig iron production can be increased.

Despite wide publicity, and drives among householders, it will be a surprise if the General Salvage Section, which takes up where the Industrial Salvage and Auto Graveyard Sections leave off, produces any substantial amount of material. In the first place, individual sources

WINNING THIS WAR IS EVERYBODY'S JOB

Thousands of new workers are pouring into factory doors to help produce the billions of dollars' worth of material vitally and immediately needed to win this war . . . sufficient long-experienced operators are just not available . . . it's a time when a modern type of standard machine tool like the Ex-Cell-O Precision Boring Machine can meet the emergency by doing a dual job: its easy control and automatic operating features make it possible to train ordinary operators in an exceptionally brief time to bore, turn, face, groove metal parts to the highest commercial standards of precision in size and finish, with a minimum of operator fatigue; this ease of operation, combined with basically sound engineering design and substantial, rigid construction for which all Ex-Cell-O machine tools are noted, *assures the extreme in production, every hour, every day.*

EX-CELL-O CORPORATION • DETROIT, MICHIGAN

Below: Standard Double-End Ex-Cell-O *Precision* Boring Machine—used for many multiple and progressive operations, on the same part or various parts, to speed up war production.

XLO

EX-CELL-O *means* PRECISION

Precision THREAD GRINDING, BORING AND LAPPING MACHINES, TOOL GRINDERS, HYDRAULIC POWER UNITS, GRINDING SPINDLES, BROACHES, CUTTING TOOLS, DRILL JIG BUSHINGS, PARTS

are small, and even in the aggregate, particularly when the farms are cleaned off, total tonnage available will not be tremendous. Secondly, this section of the salvage effort, unlike the others, is tied in closely with local politics in such a way as to constitute a brake on quick, clean-cut action. In San Francisco, for instance, householders contributed willingly to tin can and metal drives only to discover that local garbage interests, sleeping with the city government, were being well paid for their part in the collection campaign.

WEEK'S largest contributor to the salvage drive on the coast was the Washington State Toll Bridge authority, which ordered the sale of 7660 tons of steel in the Tacoma Narrows Bridge towers and cables. This was the suspension bridge which collapsed a year and a half ago in a high wind.

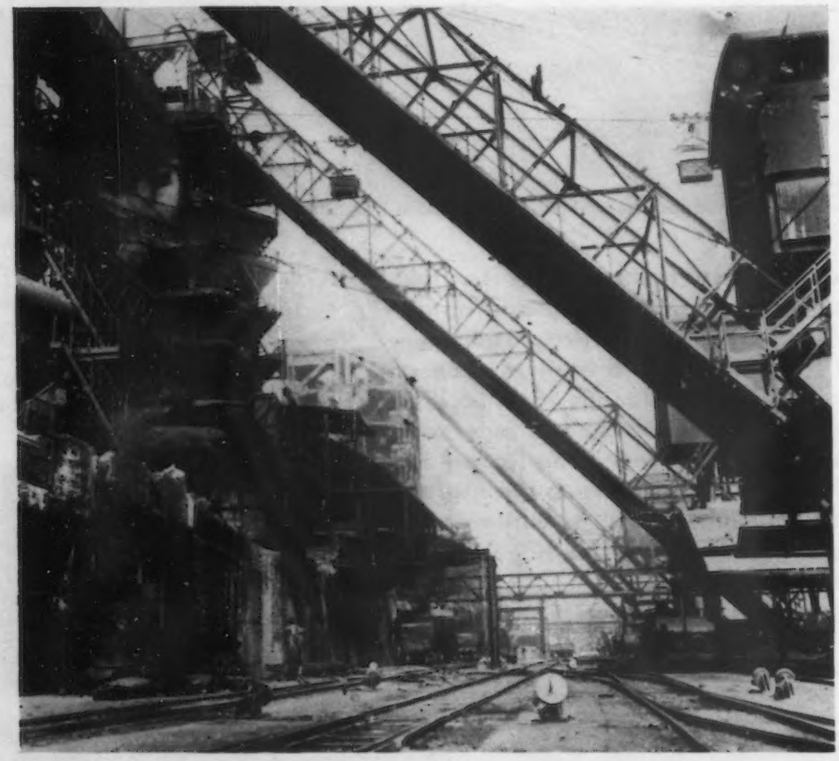
In the Pacific Northwest, the Maritime Commission is reported studying the possibility of large-scale construction of wooden cargo ships, both in this country and British Columbia. No definite wooden ship construction program has yet been outlined, and the present survey undoubtedly represents research as to what can be done if such construction proves essential. Increasing scarcity of steel may make wooden ships necessary, particularly on coastal routes, if required tonnage is to be provided for overseas. The wooden cargo vessels would, of course, reduce the pressure for tonnage steel, but the over-bearing demand for engines, shafting, winches, deck fittings, etc., would continue.

The Navy has placed a number of contracts in the Northwest, and taken delivery under some of them, for wooden vessels for such auxiliary work as mine sweeping. Several of the smaller yards are undertaking this construction, and new yards are being constructed to handle more wooden contracts.

The CIO program to organize Douglas Aircraft's three Southern California plants and several other smaller aircraft producers is taking form substantially as predicted. The influence of contracts negotiated by the CIO United Automobile Workers with Ford was not underestimated by this column, for the announced goal at Douglas and the other firms now is that wage rates shall be "at least as high as those now agreed upon between the Ford Motor Co. and the UAW. Those rates provide for an 85-cent hiring rate, 95-cent minimum rate, $1.60 maximum rate and an average rate of $1.16." If efforts to obtain such a wage at Douglas are successful, the door will logically be opened for readjustments at all Southern California aireraft plants, despite the fact that general wage scales are lower on the coast. Another notable point in the union's policy is the demand for "war profit bonus to all employees on the seniority list, including those in the armed forces of the United States." Thus, in principle, profits would become an added reward for labor rather than accruing to capital, and all sorts of interesting avenues of remuneration would be opened up for the future. Significant insofar as the aircraft industry is concerned is the mention of job security through strict seniority, and post-war job security for employees entering the armed forces through maintenance of their seniority rights. Job security after the war in an out-and-out wartime industry, such as aircraft, presents problems in means of attainment. Reflecting employment trends, the union also asks like pay for like work, regardless of sex.

The union justifies its wage demands in the face of President Roosevelt's request for stabilization on the grounds that "in industries where sub-standard wages (less than $1 an hr.) exist, wages should be increased to insure a decent standard of living and maximum efficiency to industry."

JAP BLAST FURNACES: The Yawata Iron Works at Fukuoka, one of the largest in the Orient, is one of the government controlled plants. This with six other firms represent a capital estimated at $120,000,000.



Chicago Industry to Hear Address by Knowlson

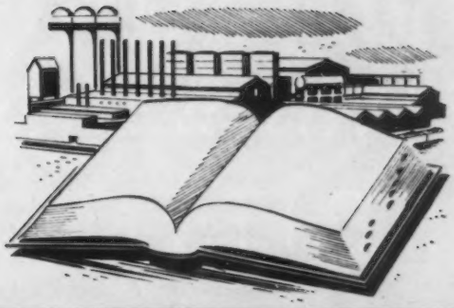
Chicago

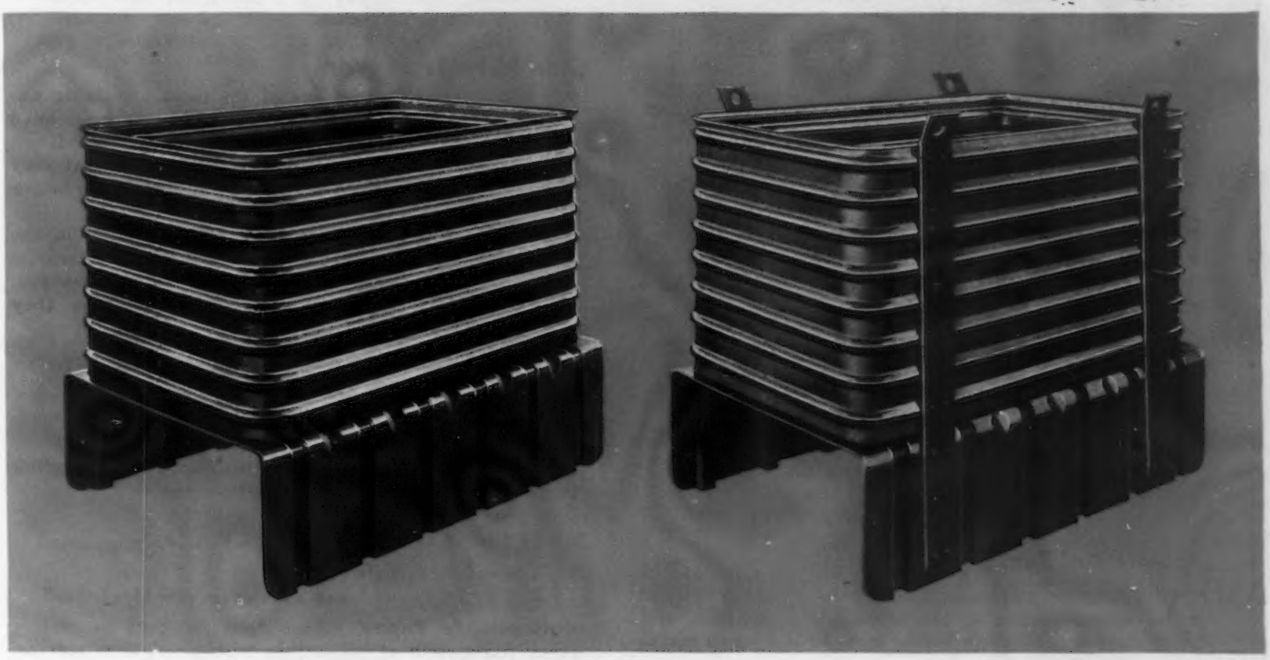
• • • **James S. Knowlson,** director of the Division of Industry Operations, WPB, will be one of the principal speakers at war production rally to be held at the Stevens Hotel here on May 26. The meeting is being sponsored by the National Association of Manufacturers and the Illinois Manufacturers Association.

Sessions at the rally will cover a wide variety of war subjects and speakers include E. L. Berry, Link-Belt So.; C. S. Craigmile, Belden Mfg. Co.; J. D. Cunningham, Republic Flow Meters Co., and R. M. Gaylord, Ingersoll Milling Machine Co.

A New Word to Add to Your Industrial Dictionary

TRUSCONVEY





and here's what it means to you

More efficient storage of parts and materials, at strategic points throughout your plant!

More efficient movement and delivery of this material to production lines!

You secure these cost-reducing advantages when you use Truscon Steel Boxes and Skid Platforms to TRUS*CONVEY* anything that involves moving operations in your plant. These sturdy, long-lasting Truscon units are designed to meet the particular requirements of each individual material handling job. They can solve a wide variety of handling problems, simplifying operations, speeding production, encouraging profits.

Learn to say TRUS*CONVEY*—learn the many benefits you will receive from Truscon Steel Boxes and Skid Platforms—let us study handling conditions in your plant and make well-planned recommendations without obligation. Write us today.

Investigate TRUSCON Foundry Flasks

Light weight . . . durability . . . strength where strength is needed . . . easily rammed and shaken out . . . these are features of economy and production you get in TRUSCON foundry flasks.

Write for descriptive literature on complete line.

Truscon

MATERIALS HANDLING EQUIPMENT

Truscon Steel Co., Pressed Steel Division, 6100 Truscon Avenue, Cleveland, Ohio. Subsidiary of Republic Steel Corporation.

YOU'LL FIND IT WILL PAY TO *TRUSCONVEY* YOUR PLANT MATERIALS

Fatigue Cracks

BY A. H. DIX

Osmotic Orchid

• • • We have always longed to use *osmotic* in print, as it is one of our favorite words. But not being sure of what it means, we have risked it only in conversation. To our aid comes Charles F. Hood, president of the American Steel & Wire Co., who said in a recent address before the American Supply and Machinery Manufacturers Association:

> There is hardly an industry . . . that is not served by at least one good trade publication—a publication edited and compiled by intelligent men, aware of the industry they are covering and its problems and interested in keeping it informed.
>
> Now, just because you take a great number of trade publications don't think you are well-informed. The information doesn't seep through the cover and into your consciousness by a system of osmosis. It takes time and careful, intelligent reading . . .

Outcurves Coming In

• • • The War Production Board's recent order cutting down the use of steel in corsets moved a WPB stenographer to write:

To keep our ships on even keel
Takes tons and tons of corset steel.
The die is cast; their fate is written.
The ladies now must bulge for Britain.

Aptronym

• • • Roy Husbands represents the Woman's Home Companion.

—*Bill (Armco) McFee.*

Babbitt Ball Bearings

• • • The *New York Herald-Tribune* recently printed in its sports section a photograph of net, links and track stars contributing loving cups to the scrap metal drive. The caption reads:

> ". . . it develops that those 'silver' trophies are chiefly pewter, or babbitt metal, an essential for ball bearings . . ."

With Abated Breath

• • • A member of the brains department has his stenographer type "87th Iron Age Year" just below the date on his letters. We had always regarded this as unnecessary, believing you could hardly find a man, woman or child in the United States who did not know that your favorite family journal is the country's oldest existing business paper, that it was established in 1855, and that with the exception of a publication which antedated it by eight years, it was the country's first.

But now we are not so certain. One of our district managers tells us that when he was making an advertising presentation recently, he noticed his audience had never heard that refinement is the knack of yawning with closed mouth. When our man paused for breath, the audience said, *"Just a minute. Let me get this straight. What is* THE IRON AGE? *Is it one of those publications that was started during the depression?"*

Putnam Said It

• • • "Don't fire until you see the whites of their eyes" —Commodore Perry??? Wasn't that the expression credited to the Battle of Bunker Hill or the Battle of Quebec?

—*W. T. Rietzke, Advertising Manager, Hammond Machinery Builders, Inc.*

Bunker Hill it was. General Putnam said it. No doubt something was said at Quebec, but that was before our time. Perhaps Deac, who is older than we are, will recall it.

Cube Root Kills 'em

• • • If you will look up Amendment No. 5 to Order M-63, covering imports of strategic materials, you will find that it adds the following under list A: Cube root, derris root, etc.

I was not surprised at this for cube root has been difficult for me to obtain ever since the eighth grade, and as a patriotic contribution the youngsters can get along with square root for the duration.

But unfortunately for them, I find upon checking Webster that "cube" is "any one of several tropical American plants used as fish poison."

—*Charles T. Post.*

Add Horrors of War

• • • It is too bad that one of the most promising natural substitutes for Far Eastern rubber should have such an awkward name as *guayale*, pronounced, we believe, *hy-ool'-ee*. Of course, if you say it that way no one will know what you are talking about. So better stick to *goo-ale* and then laugh.

The Russian substitutes are just as tough on the tonsils. They are, according to Bill Sherman's treatise in a recent issue of *The Assembly Line*, *kok-sagyz*, *tau-sagyz*, *vatochnik*, and *evkommia*. War, as they say, is hell.

Patriotic Stimulants

• • • Eugene Henry, president of Stream Line Tools, Conover, N. C., adds to our collection of patriotic epistolary sign-offs. He ends his letters, "Yours for X*." The X is struck over with a dash, thus creating two v's, a rightside up one and an upside down one. The asterisk leads the eye to the bottom of the letter, where this is typed:

> "Coupled V for Victory up here
> and down under with MacArthur."

Automobile Topics' editor tells us that he starts every paragraph of his letters with...—, thus placing him several up on our Advertising Department, which uses it only in the sign-off, "Yours for ...—"

The brains department's Don James has on his desk lamp a tag issued by the Porter-Cable Machine Co. reading, *"I've Got MacArthuritis——Have You?"*

Harmonic Heads

• • • Like opening oysters, the writing of news headlines is something that is done best if executed with celerity. If you dawdle over it the results are usually poor. Your expert news headline writer works with surprising speed.

The ideal headline tells you neither too much nor too little. It does not oversell nor undersell, but leads you smoothly into the story, without calling undue attention to itself. In our biased eyes, the six to ten-word news headlines you find in your favorite family journal are among the fairest flowers of this acre of the Fourth Estate. To appreciate the skill that goes into writing the dozens that meet your eyes here each week try your hand some night at writing five or six and you will wish you had gone to the air raid warden meeting.

The only headline that skittered a bit on the quick trip from eye to cerebrum was a recent one reading, *"Telegram from General Gingers Tank Workmen."* We kept expecting to read something about General Gingers.

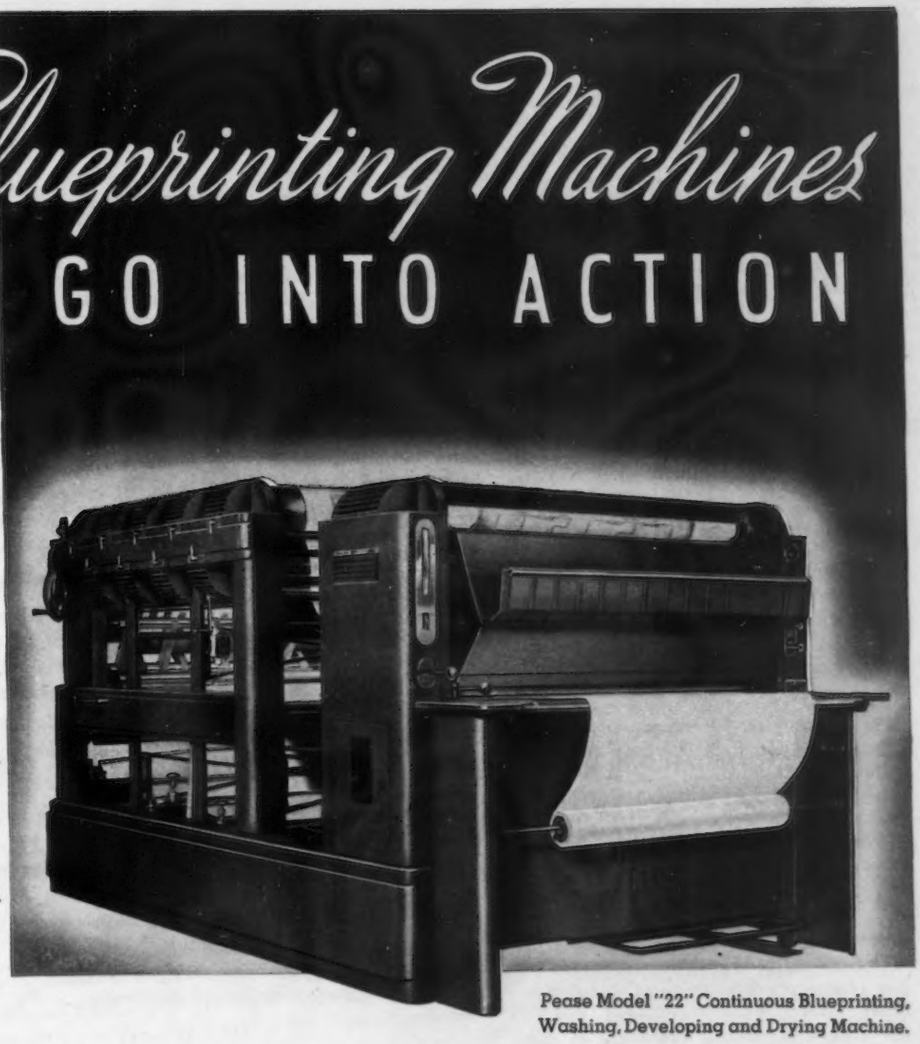
Puzzles

• • • Each side of last week's miniature field was .770 yd. long and the area was 2.31 sq. yd.

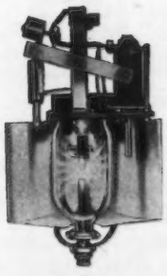
Three minutes is par for this:

One of seven guests of a restaurant dined there each day; a second guest dined there every second day; a third every third day, and so on to the seventh, who ate there once every seventh day. After how many days would the entire seven appear at the same time?

Pease Blueprinting Machines GO INTO ACTION



Pease Model "22" Continuous Blueprinting, Washing, Developing and Drying Machine.



3 SPEED "ACTINIC" ARC LAMPS

Pease High Power "Actinic" Enclosed Arc Lamp features an exclusive shunt circuit, which permits operation at 10, 15, and 20 amperages at will.

OTHER OUTSTANDING FEATURES OF MODEL "22"

Sliding "Vacuum-like" Contact • Horizontal Water Wash • Quick Change Chemical Applicator System • Thermostatically Controlled Drying Drums, either gas or electric.

MORE and faster Blueprints is the order of the day in the nation's defense plants from coast to coast.

The Pease Model "22" with production speed of 30 linear feet per minute is meeting this demand. It is the fastest Blueprinting machine in use today and delivers deep blue, contrasty prints at a lower cost per square foot than any other tracing reproduction equipment.

Government Departments, Commercial Blueprinters and Industrial Organizations with expanding requirements and rapidly maturing plans rely on Pease Blueprinting Equipment to speed vital production.

Write for descriptive information on our complete line.

THE C. F. PEASE COMPANY

2695 WEST IRVING PARK ROAD • CHICAGO, ILLINOIS

Blueprinting Machines A TYPE AND SIZE FOR EVERY REQUIREMENT INCLUDING DIRECT PROCESS PRINTING

Dear Editor:

PRICE GUIDE

Sir:

Some time ago I saw mentioned in your magazine a ruling by the Government of the United States, concerning maximum prices which could be paid for machine tools. As I remember, the price was a percentage of the new price and depended on the condition and age of the machine involved.

Will you please be kind enough to let us know the number of this ruling and where we could procure a copy of it for our own edification.

W. J. ANDERSON,
Purchasing Agent,
Reliance Aircraft and Tool Co., Ltd.,
Toronto

• Copies of The Iron Age Price Guide are available, with revision sheets bringing the Guide up to date.—Ed.

SUB-ZERO GAGE AGING

Sir:

Will you please send us any references that you may have to recently published articles on the aging of tools and gages by means of low temperature?

We manufacture Sub-Zero Industrial Refrigerators.

HOWARD D. WHITE,
Chief Engineer,
Revco, Inc.,
Adrian, Mich.

• Occasionally we have referred to low temperature storage of dural aircraft rivets, once mentioned Ford's pre-assembly use of liquid air at 320 deg. F. for cooling exhaust valve seats, but recall no articles on this subject.—Ed.

THE TIN CAN

Sir:

I should like to have sent me the recent issue of THE IRON AGE, in which is contained the treatise on electrolytic tin plate, outlining the proposed installations by the different tin plate manufacturers.

JOHN M. REED,
Republic Steel Corp.,
Warren, Ohio

Sir:

We have decided to increase our order for reprints of the article, "The Tin Can," to 200.

J. J. NAGLE,
Treasurer,
Crown Cork & Seal Co., Inc.,
Baltimore

Sir:

Your article on "The Tin Can" in the April 30 issue of THE IRON AGE has interested us very much. If possible, we would appreciate receiving 10 or 12 reprints.

M. M. GILL,
Librarian,
American Can Company,
Maywood, Ill.

• Reprints are now available.—Ed.

EDITORIALS

Sir:

In the April 16 issue of THE IRON AGE, there appeared an editorial by Mr. J. H. Van Deventer which was entitled "Can You Save 30 Seconds A Day." This editorial is something that every worker in the country should read because it goes at the lost time problem in such a vivid manner.

I believe that this editorial is something that we could use along these lines and wonder if it is possible for us to have about fifty copies of it.

ROBERT A. HARVEY,
Cleveland Twist Drill Co.,
Cleveland

Sir:

Should reprints be available of the May 7 editorial, "Observations of a Traveling Editor," we would like to have 25 copies.

A. J. SCHILL,
A. J. Schill Co.,
Houston, Texas

MAGNAFLUX

Sir:

We are advised by the Magnaflux Corp. of Chicago that you recently published two articles on the subject, "Magnafluxing Inspection."

We would appreciate having reprints of these articles, if they are obtainable.

C. W. HATHAWAY,
Chief Engineer,
Decatur Pump Co.,
Decatur, Ill.

STEEL EARNINGS

Sir:

At times, we have occasion to refer to the summary which you have published annually for a number of years showing capacities, earnings, indebtedness, etc., for the various steel companies.

So far we have not received the report for the year 1941 and are wondering whether or not a copy may have been accidentally left out of our particular issue of THE IRON AGE or whether it has as yet been published.

JOHN McALLISTER,
The Colorado Fuel and Iron Corp.,
Denver

• Pressure of other work has so far prevented compilation of this data, but the May 14 issue has a net earnings table on page 85.—Ed.

WELDING

Sir:

In the March 25, 1942, issue there appeared an article by Bernard C. Tracey of this company entitled, "Protection for Welding Operators."

May we have your permission to reprint this article? We shall, of course, give your magazine the customary credit and copyright lines.

E. T. O'NEIL,
General Electric Co.,
Schenectady

• Permission granted.—Ed.

KUDOS

Sir:

Following a very careful study of the available trade literature and its relative usefulness to this organization, your publication entitled THE IRON AGE merits our immediate attention.

It is felt that since many of our employees will have to be self-trained every effort should be made as soon as possible to provide reliable and up-to-the-minute information for their study. THE IRON AGE has this type of information.

JOHN M. LUTHER,
Asst. Chief Engineer,
Globe Aircraft Corp.

CLECOING

Sir:

I always read with interest the articles in THE IRON AGE, but being a layman I am continually having to use the dictionary, which is a wholesome exercise.

I have just been reading the article "Briggs Aids Aircraft Production" in the Jan. 8 issue, and find a word used which I have been unable to discover in the dictionary.

The article refers to "parts to be clecoed together" and "attaching the skin by clecoing and final riveting." Can you describe what this clecoing process is, please?

DON PATCH,
Boston

• The process referred to by Briggs' engineers as clecoing is the application of Cleco sheet holders for temporarily clamping the aluminum alloy sheets together prior to riveting. The Cleco sheet holder is a spring actuated device that is slipped into the previously drilled rivet holes by means of a special pair of forceps or pliers. After a few rivets are driven, the device, a product of the Cleveland Pneumatic Tool Co., is removed with the same pair of forceps with which it was installed.—Ed.

BEARING SURFACE

Sir:

Will you please send to the writer a copy of THE IRON AGE showing the article, "How Smooth Should a Bearing Surface Be."

S. D. LANGLEY,
Supervisor,
General Electric Co.,
Erie, Pa.

WHEELABRATOR AIRLESS BLAST CLEANING CONSERVES IN 10 DIFFERENT WAYS

CONSERVES	1	**TIME**—by cleaning faster and speeding up shipment of orders.
CONSERVES	2	**HORSEPOWER**—by eliminating air, the WHEELABRATOR saves power up to 80%.
CONSERVES	3	**CUTTING TOOLS**—by thoroughly removing sand and scale, tools stay sharp longer and require less frequent grinding.
CONSERVES	4	**MANPOWER**—by mechanizing loading and unloading to a high degree, and by greatly simplifying all other operations.
CONSERVES	5	**SPACE**—by reason of its cleaning speed and capacity fewer machines are required.
CONSERVES	6	**ABRASIVE**—by using metallic abrasive, a ton of which does the work of a carload of sand.
CONSERVES	7	**MATERIAL**—by reducing breakage to the minimum an appreciable saving in time and money is effected.
CONSERVES	8	**SUBSEQUENT OPERATIONS**—by removing sand and scale down to the virgin metal the final machining, grinding and inspection operations are handled more rapidly.
CONSERVES	9	**EQUIPMENT**—by reducing piping requirements and by eliminating air compressors, compressor motors, pressure tanks, mixing chambers, hose, valves and nozzles.
CONSERVES	10	**MONEY**—by saving time and material, as emphasized by the 9 preceding points.

NEVER has Conservation been so vitally necessary as it is now, when our entire national economy is directed toward one end—the accomplishment of complete Victory.

In the cleaning and finishing of war materials the subject of Conservation has taken on a new meaning, because the airless WHEELABRATOR has injected into it a new concept of economy by reason of the Time—Power — Equipment — Materials — Labor — and Space it saves.

DO YOU KNOW THAT . . .

Heat treat scale from small bearing rings and rollers is being removed in a 15 x 20" WHEELABRATOR Tumblast in only 7 minutes at the Fafnir Bearing Co., New Britain, Connecticut.

Grinding costs were reduced 75% due to cleaner work at Cape Ann Tool Co., Pigeon Cove, Mass., when a 36" x 42" WHEELABRATOR Tumblast was installed for cleaning miscellaneous forgings.

READ THE WHEELABRATOR DIGEST

Keep in tune with the latest developments in metal cleaning. We will be glad to add your name to our mailing list to receive this bi-monthly publication.

TRADE MARK THE AMERICAN MOLDER

AMERICAN FOUNDRY EQUIPMENT CO.

510 S. BYRKIT ST. • MISHAWAKA, IND.

This Industrial Week . . .

PIECED together from random sources, developments of the last few days show more clearly how the might of industrial America is beginning to win this devastating war. With real mass output of war goods an actuality in the United States, the rapid transposition on the production front is without a parallel.

Remarks of appropriate authorities, summed up, indicate that tank production is at a new all-time peak; that the Michigan area is fast approaching its goal of tremendous and varied war production; that armor plate production will be expanded materially with the completion of new facilities by Carnegie-Illinois Steel Corp.; that more facilities will be financed to process vanadium and other needs, and that new processes for the high speed mass output of vital parts are being brought into play. "It's a superb job," said Lieut. Gen. B. B. Somervell, commanding general of the services of supply, paying a justly deserved tribute to the industrial mobilization.

Quick Victory Best for Industry

The good news has led to a rise in predictions that the war will be over more suddenly than expected, expectations which are difficult to support on the basis of the present known facts. Certainly the prompt winning of the war would be best for United States industry, biggest loser in World War I.

The job that industry is doing continues surrounded with uncertainties and new problems, however. Politics (this being an election year) looms as one potential source of difficulty which may be more apparent in the next few months. The stand taken by the Steel Workers Organizing Committee at their convention this week that "wage freezing would be destructive of all collective bargaining and trade unions" leaves doubt as to the effectiveness of the national stabilization program. Apparently union leaders hold the belief that a general wage freezing order could not be handled intelligently.

War Profits to Be Driven Down

With the government reexamining all major procurement contracts, the possibility that profit margins will be driven down is distinct. Last week it was announced that the Aluminum Co. would reduce its prices of fabricated aluminum, a move which came on the heels of word that renegotiation of contracts is under way on a broad scale and that the government is seeking to save money wherever it is the principal buyer. In the steel industry, government experts are understood to be paying particular attention to steel extras, their application and their reason for application.

At the same time, however, total of government subsidies is increasing. Already assistance is being provided through the RFC on coal shipments into New England. OPA is surveying the problems of manufacturers and merchants who need aid, with a view toward establishing some system like the British Liabilities Act which provides for adjustments between creditors and debtors. In all cases where assistance is necessary, the criterion in this country probably will be: "Does it help win the war?"

The dropping of some steel expansion projects along with other war plant expansion seemed certain this week as WPB admitted that it had started material surveys with the idea of decreasing plant expansion in favor of more production of guns, ships, aircraft, tanks. Just what projects will be abandoned is not known at this time as studies are not complete.

The change in the course of the war, making it necessary that munitions be produced to the limit, is one reason for the change in expansion plans. A condition of priority inflation caused by the fact that there are more high preference ratings current than there are available materials is another logical reason for the curtailment. New plants for the production of synthetic rubber, aluminum, gasoline, etc., will go forward as scheduled.

Stricter Steel Control Seen

Whether the WPB will take action soon or not, complete mandatory control over some steel products similar to the setup on plates and pig iron, seems to be indicated by present steel mill distribution problems. Due to the stepping up of priority ratings, steel company books are more unwieldy and it appears likely that some of the high rated tonnage being shipped at present is destined to become dead stock. During the past week many steel mill units were unable to produce

Steel Ingot Production—Per Cent of Capacity

(Open Hearth, Bessemer and Electric Ingots)

	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	S.Ohio River	West	St. Louis	East	Aggregate
Week of May 19...	98.0	104.0	100.5	92.0	95.0	104.5	83.0	98.5	105.5	101.0	97.0	111.0	107.0	99.0
Week of May 12...	99.0	105.5	100.0	92.0	98.0*	104.5	83.0	98.5	105.0	101.0	98.0	100.0	104.0	99.5

* Revised

other than allocations and A-1-a business.

Westerner Heads Iron & Steel Branch

The selection of Reese H. Taylor, president of the Union Oil Co. of California, as successor to C. E. Adams, resigned head of WPB's Iron and Steel branch, apparently was partly due to a growing demand in the Far West for recognition of the increasing part that section of the country is playing in the planned development of the steel industry and its contribution to the war effort. For it is said that the curtailment of the steel expansion program will not stop the construction of new capacity there, although there are reports that the expansion in the Far West will not be as great as originally planned. Mr. Taylor's selection was due also, it is said, to his practical experience in the steel industry acquired as production manager of Consolidated Steel Corp., Los Angeles, from 1929 to 1938.

Batt's Duties on WPB Increase

William L. Batt's resignation as director of materials was ascribed to pressure to many other duties and his rising responsibilities as chairman of WPB's requirements committee, in which capacity he will devote most of his time. This will tie in with his work as American representative on allied nations boards in dividing up raw materials which are now going more and more into tanks, ships, guns and aircraft rather than supplies for new construction. A. I. Henderson, who has moved up to become director of materials, has organized his staff to push along its new job of swelling production.

This week's price news begins on page 108.

This week's Priority news begins on page 114.

Another step toward the use of the Production Requirements Plan to allocate specific quantities of materials to manufacturers on the basis of the importance of their output to the war was made this week when the use of Form PD-25-a was revised so that ratings assigned under that form will depend more on the nature and use of the applicant's product and less on the ratings now carried on the applicant's books. By July 1, the PRP, with all of its ramifications, is expected to be in operation. This will mean possibly the revocation of about 80 to 90 per cent of existing preference rating assignments through "P" orders, with their related forms, and for them will be substituted the "end use" code set up under the Production Requirements Plan.

Steel Output Sags Half Point

With the two major steel producing districts, Pittsburgh and Chicago, reporting operations for the coming week down slightly, the steel operating rate for the country will be down ½ point to 99 per cent of capacity. All districts that reported losses have curtailed operations entirely for furnace repairs, and it is believed the flow of raw materials, both pig iron and scrap, has not in any way hindered operations.

Districts reporting down were: Pittsburgh, down 1 point to 98 per cent; Chicago down 1½ points to 104 per cent; Cleveland down 3 points from last week's revised operations of 98 per cent to 95 per cent; and the western rate is down 1 point to 97 per cent.

The Youngstown rate is up a point to 100.5 per cent; Detroit is up a point to 105.5 per cent; St. Louis is up 11 points to 111 per cent, and the Eastern rate is up 3 points to 107 per cent. Districts that reported no change are: Philadelphia at 92 per cent; Buffalo at 104.5 per cent; Southern, at 98.5 per cent; and the Southern Ohio river district, at 101 per cent of capacity.

The iron and steel scrap supply situation at major consumption centers has reached a comfortable level considering the high rate of usage. Aided by favorable weather and the impetus of wrecking programs and public drives, the volume of scrap is better than at any time in nearly a year. Another factor in the return to normalcy is the relaxation in the rule governing loading of mixed grades of scrap by removing the $2.20 a ton penalty and allowing all mixed grades in a shipment to move at the price of the lowest grade.

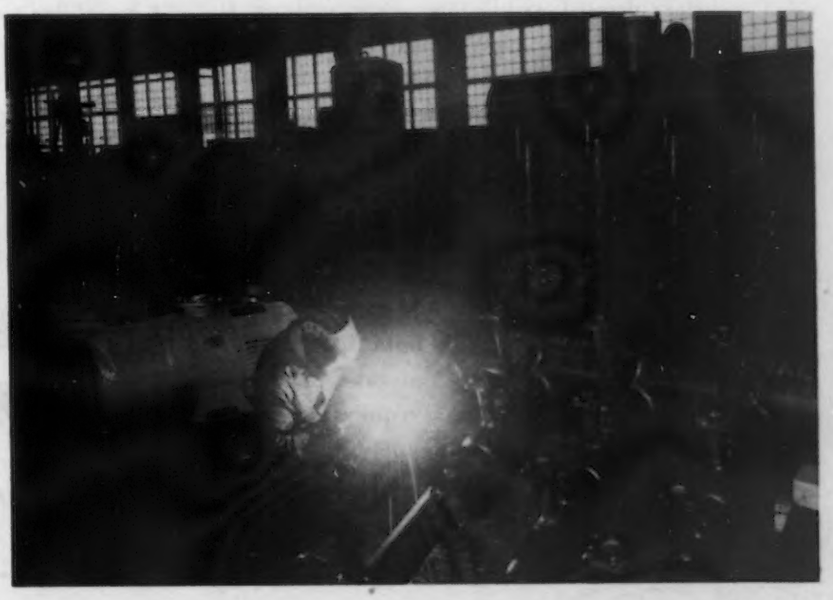
Westinghouse to Build New War Plant

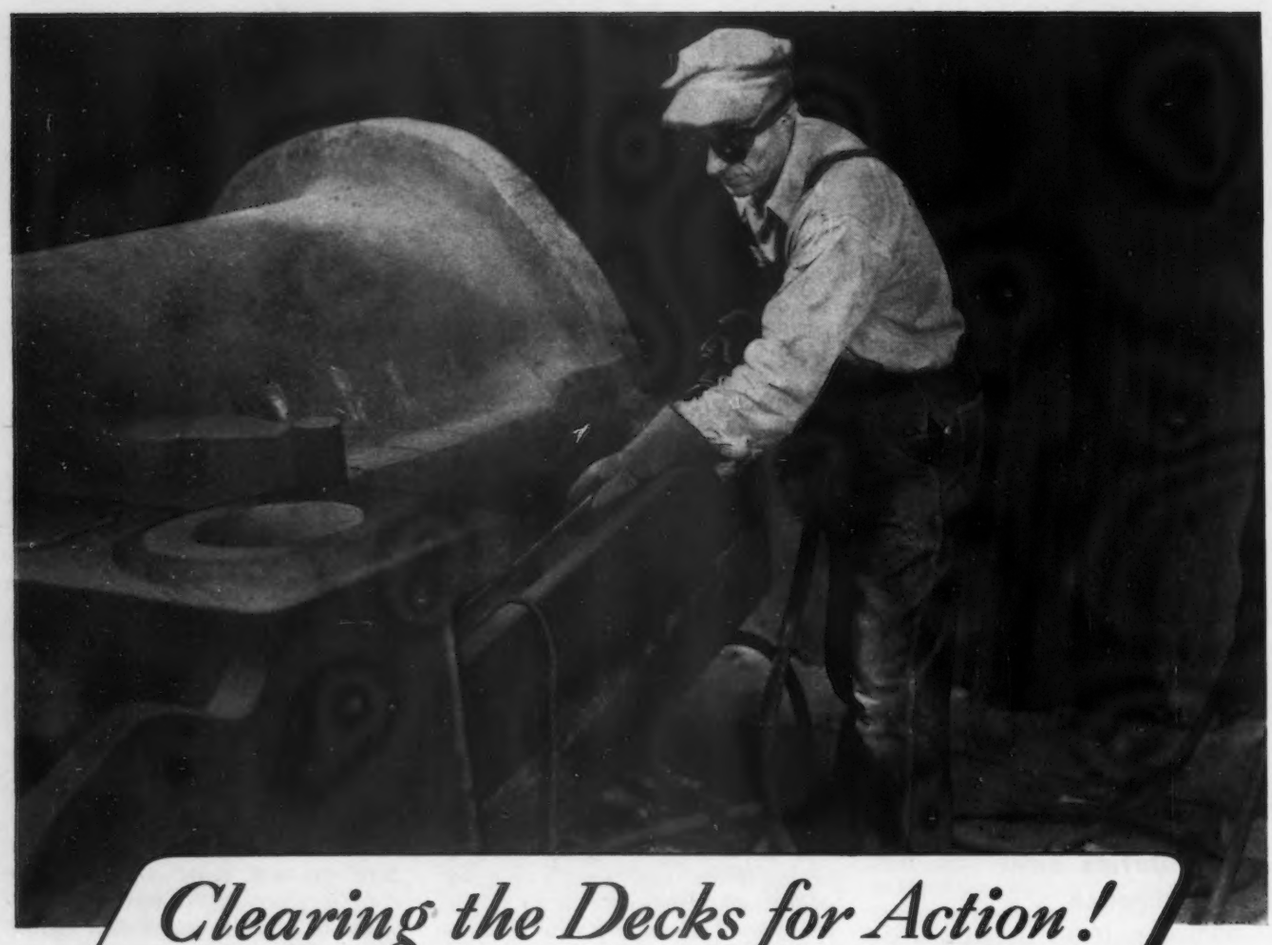
Pittsburgh

• • • **Westinghouse Electric & Mfg. Co.** will build a $14,000,000 defense plant in Western Pennsylvania to produce propulsion equipment for the Navy. The company will both build and operate the plant for the Bureau of Ships, Navy Department, it was announced.

WELDED ACCUMULATOR: Fabricating an ammonia accumulator at the plant of the Vilter Mfg. Co., Milwaukee. One of the complete units, made of standard pipe by flame cutting and arc welding, can be seen in the background. A total of 238 separate welds are required on each accumulator.

Courtesy Air Reduction Sales Co.





Clearing the Decks for Action!

ALLOY STEEL CASTINGS ON THE FIRING LINE

The big casting above, having its surface dressed with a pneumatic chipper, is only one of the many which have emerged lately from the sand of Allegheny Ludlum foundry floors, and gone to serve Uncle Sam.

Some are riding the seven seas. Others are on the job in hydro-power plants or process industries, as much a part of the war effort as if they, too, were in the armed services.

Castings or forgings; sheets, strip or plates; bars, wire or tubing—every form that stainless and heat-resistant steels can take, and any analysis that the job may require—all these are *our* job. But we want to apply this "know-how" in helping out *your* job, too . . . helping you to conserve materials, avoid waste, and speed up production.

Call on our technical staff and field representatives for any assistance you may need in the fabrication and use of high-alloy steels. ● *You'll find our 124-page "Handbook of Special Steels" valuable for reference—write for a copy.*

AL
STEEL FOR THE NATION'S WELFARE

Allegheny Ludlum
STEEL CORPORATION
GENERAL OFFICES: PITTSBURGH, PENNSYLVANIA

News of Industry

WPB Meeting Explains How Order M-126 Will Operate

• • • **At New York** and Chicago meetings attended by more than 1500 business men who will be affected by the iron and steel conservation order, M-126, members of the WPB told the reasons for the order, history of the order, the general situation in iron and steel, and how the order will be administered.

Curtailment of the use of iron and steel in some 400 products, as required by the terms of conservation order M-126, is "only the beginning," business men were advised. WPB authorities reported that a new list of some 300 to 400 products, which shortly will be added to "List A" of order M-126, is being cleared at Washington and will be announced soon. They also predicted that still other items would be added to the list from time to time until every use of iron and steel not directly essential to the war effort is completely stopped. Many of those attending were obviously still not able to grasp the fact that this order meant the end of their normal business within 90 days, for at least the duration of the war. They came to the meeting hoping to be told that their fears were exaggerated, but left with the warning ringing in their ears that if any business is counting on trailing along with what essential materials he can scrape up and then turning to defense work later, he had better wake up.

At the same time, it was announced that administration of this drastic order, which is reaching into practically every small and medium plant in this area, will be handled by a separate division of WPB currently being set up in New York, headed by Edward F. Addis. This new division, to be known as "M-126 Division," will have it offices in the Chanin Building, 122 E. 42nd Street, New York. Sole authority for interpreting the order and for the granting of relief from its terms will rest in this division.

More priority news on page 114.

A revision of the order is to be made in about 90 days, which will consist of a new group of products known as "List C." This new group, drawn largely from "List B" of the present order, will consist of items needed by the Army and Navy for the war effort. The products included in "List C" will be granted permanent exemption from the restrictions of the order.

Details of the procedure for making appeals for relief from the the terms of the order were discussed at the meeting, but businessmen were warned that all appeals would be weighed on the basis of "How would granting this appeal further the war effort?"

Appeals for relief from the terms of order M-126 must be made on WPB form PD-437, obtainable from WPB field offices.

Form PD-437 for making appeals for relief from the terms of order M-126 was published in THE IRON AGE, *May 14, pages 122 and 123.*

A number of interesting points were brought out in a question and answer period at the clinic, although it was pointed out that the opinions given by WPB officials there must be considered as unofficial and that a formal ruling in writing from the administrator must be obtained before an interpretation could be considered official. However, while unofficial, these opinions are interesting as indicating the general trend of such possible rulings.

It was emphasized that order M-126 cuts across all priority ratings. If a product is now included on "List A," it cannot be assembled after 90 days, even though it may be carrying an A-1-a rating. There is no exception to this, other than that given for "List B" products and those to be included on the forthcoming "List C." If two WPB orders conflict, the more stringent of the two must govern. In other words, if a previously issued limitation order permits 60 per cent production and order M-126 completely prohibits output, then the terms of order M-126 prevail.

International News Photo

FIRED FIRST SHOT AGAINST JAPAN: The gun crew of the U.S.S. Ward stands by the 5-incher that fired the first shot at Hawaii against Japan in the current war.

Order M-126 does not affect the sale of products; it is directed only at the manufacture of an item. Thus, M-126 has no control over the sale of a product from inventory after the deadline on production. Scrap steel cannot be used to fabricate products where the use of iron and steel is prohibited. Steel in process before May 5, also comes under the terms of the order. Where products were manufactured for only a few months of 1941, the base year for determining the 75 per cent rate production permitted for 45 days after May 20, a manufacturer should work from a monthly average based on the number of months in which the product was manufactured in 1941.

It is not permissible to process

or assemble after the deadline of the order, even though fabricated parts in stock would last beyond that deadline. The responsibility for observing the terms of the order rests entirely upon the processor or assembler. In the case of a plant making an item sold by another company, the plant making the item is responsible for observance of the order.

• • • **A summary** of the question and answer period following the WPB meeting on iron and steel conservation order, M-126, is as follows:

1. Where can I get a copy of the order and the appeals form, PD-437?

A. From the WPB office nearest the plant.

2. How can I get an explanation of any part of the order?

A. By writing a letter to the regional WPB office nearest the plant.

3. To whom do I send my appeal on form PD-437?

A. The regional WPB office.

4. How long will I have to wait for an answer to either my letter asking for an explanation of the order or my appeal?

A. All correspondence will be handled as quickly as possible. Regional offices are instructed to clear all mail to the administrator in 24 hours.

5. Who answers my letter or examines my appeal?

A. All letters and appeals are handled by the administrator's office. Regional WPB offices act only as a clearing house, and do not answer correspondence or appeals.

6. If more than one product is made in my plant, will one appeal be sufficient to cover all products?

A. No. A separate appeal must be made for each product or article appealed under the order, unless otherwise instructed by the field office.

7. How many copies of the appeal must be made out?

A. The appeal on form PD-437 must be made out in quadruplicate. The WPB field office sends the original and duplicate to the administrator, retains one copy, and the other copy is retained by the company for filing purposes.

8. Who checks to see that the appeals are filled out right?

A. The regional field office acts as a receiving, form checking, and forwarding agent of the administrator.

9. Can the field office advise whether or not the appeal will be accepted?

A. The field office is not authorized to express any opinion concerning the merits of the order or the appeal filed.

10. From whom do I receive word that the appeal is accepted or rejected?

A. The decision on an appeal will be by letter signed by the administrator of the order.

11. What determines whether or not an appeal will be accepted?

A. If granting the appeal will further the war effort, it will be accepted. Furthering the war effort is the goal of order M-126.

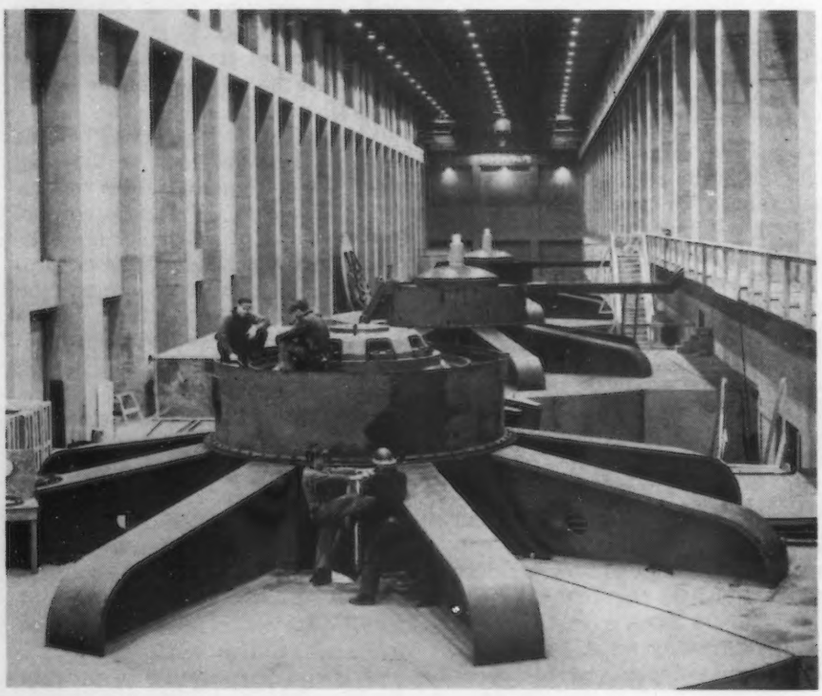
12. Should the appeal be made before the 90-day period in the order or after?

British-Combine Photo

BETTER THAN A PITCHFORK: Here's an American tank in action in England, part of a Canadian armored division which recently arrived there. The three turrets provide a lot of fire power. In England these tanks are known as the "General Lee" type.

THIRD GRAND COULEE GENERATOR: The third 108,000 kw. generator went into operation at Grand Coulee dam during the past week. The giant powerhouse at the dam will house nine of these units, and a twin to the powerhouse is being erected on the opposite bank of the Columbia River.

Harris & Ewing Photo



A. The appeal should be made as soon as it is evident that the order will interfere with war business.

13. In the event the appeal is not granted, what shall be done with finished products in stock?

A. If it is carbon steel, it may be sold on preference ratings of A-10 or higher, and if alloy steel, it must be sold to holders of A-3 ratings or better.

14. If the part being made is an A-1 part for Lend-Lease, should the manufacturer continue making it?

A. No, but the manufacturer can appeal the order.

15. Can obsolete material be disposed of to buyers without priorities under the order?

A. No.

16. If the production of a plant is already covered by a conservation order, other than M-126, and again covered in M-126, which order shall the manufacturer operate under?

A. The order that is most restrictive shall be the order that governs the production of such a plant.

17. If a manufacturer makes an item on List B of the order for a government agency, has the items completely finished within 90 days, but cannot ship the material until after 90 days have elapsed, must an appeal for shipping the material be made?

A. No. The order applies only to manufacturing, and not to distribution and shipping.

18. What is the position of a manufacturer whose products are on neither list A nor B of the order, but who uses iron and steel?

A. List A will grow. In the meantime, all manufacturers have been asked to save iron and steel.

Builders Plan Production Expansions in Cleveland Area

Cleveland

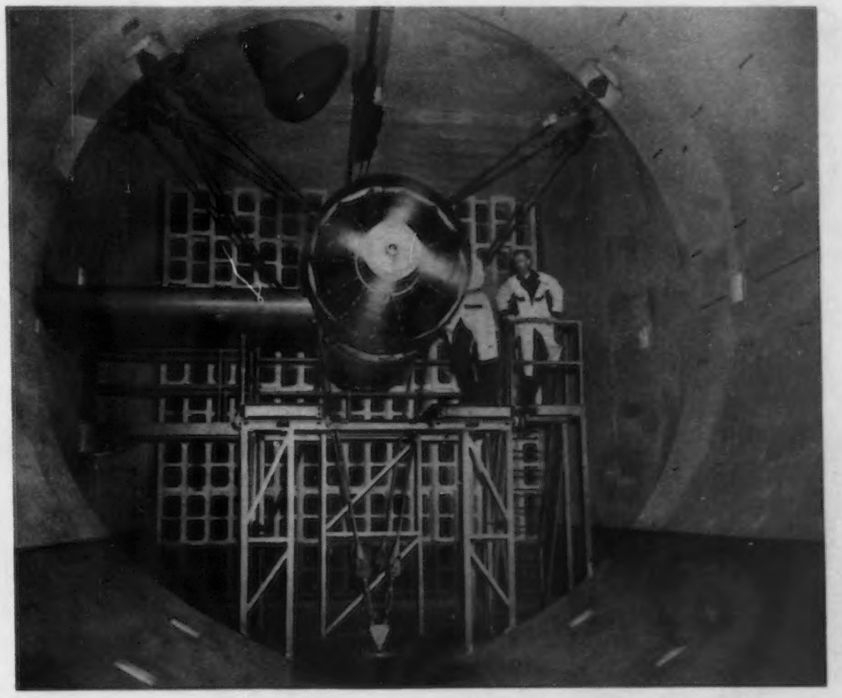
• • • **Expansions have** been arranged for by the Breckenridge Machine Co. and the Broden Construction Co. The latter company is building vertical boring mills and has a war department pool order for a number of such items. Dealers in this area are interested in the probable extensive purchases of equipment that Talon, Inc., in Meadville, Pa., should shortly place to permit its conversion to war work.

Although war production is rolling along at an astonishing rate, it is interesting to note that several recipients of important war contracts in this area have not yet completed tooling up to get into production.

Hook Calls Lack of Policy On Labor An Obstacle

Cleveland

• • • **Charles R. Hook,** president, American Rolling Mill Co. in a talk before the National Association of Broadcasters convention here on May 13, said, "The most predominant obstacle that lies in the way of still greater production is the lack of a definite war labor policy. Industrial management seeks no special consideration and would be willing to take its orders in this respect, and proceed accordingly, but the orders governing war-time labor policies have never been handed down. As a result, there is still much unnecessary misunderstanding and dissension.



Acme Photo

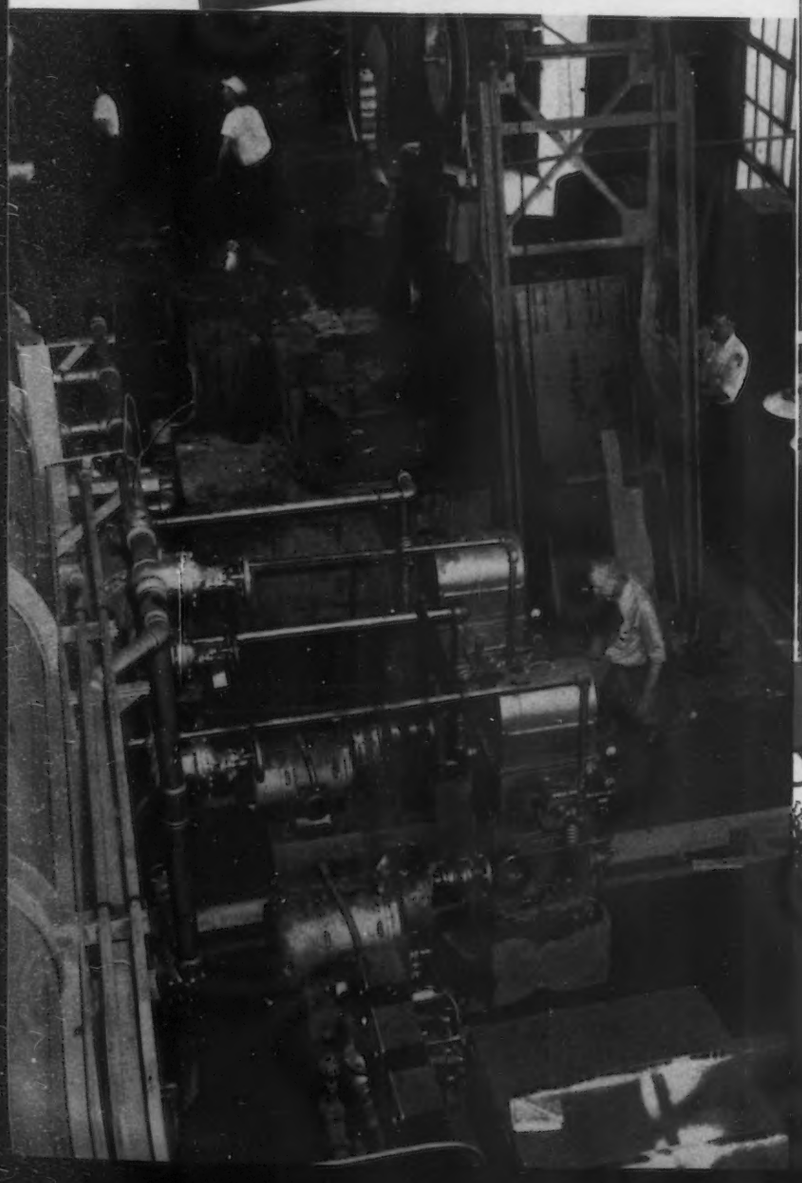
AIRCRAFT ENGINE LAB: The largest aircraft engine research laboratory in the world is now under construction in Cleveland and will be completed by the end of the year. Here, engineers watch an engine in operation on one of the two torque stands in the plant, which when completed will cost $18,000,000.

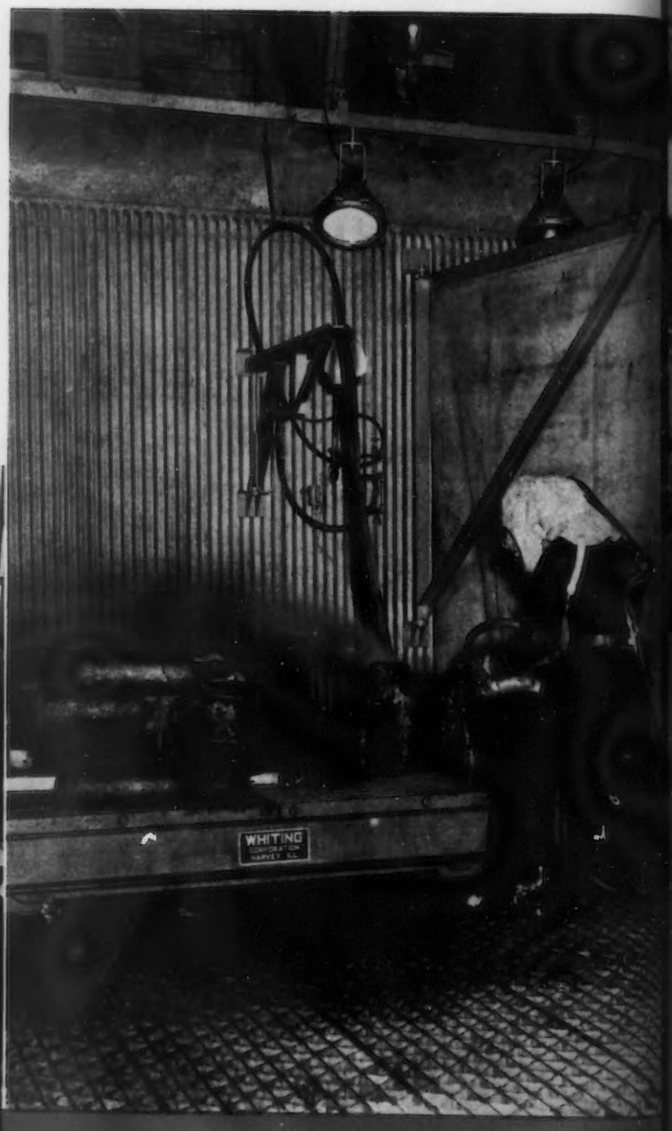
RAF'S NEW "MANCHESTER": Heavily armed with formidable weapons. this new British bomber, the "Manchester," is quite a match for enemy interceptors. Planes like these are blasting Nazi war plants on continental Europe.

British-Combine Photo

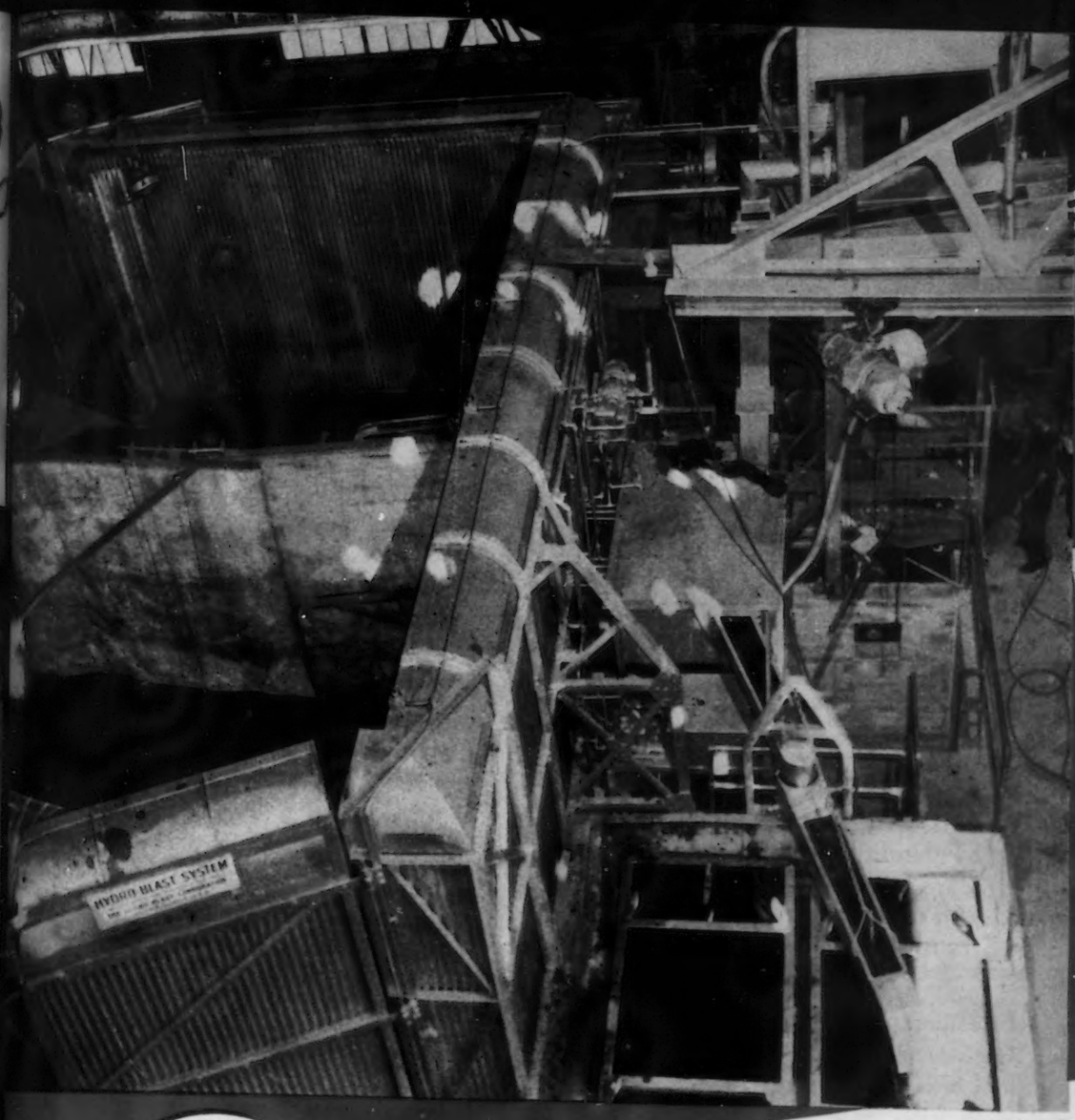
Contents Continued

The photographic reproductions on these pages show three views of the HYDRO-BLAST wet sand cleaning and sand recovery system at the Washington Navy Yard.





Manufacturing war heads at Newport Torpedo Station by Vernon Howe Bailey.



Bow of the mighty USS Alabama from a drawing by Vernon Howe Bailey.

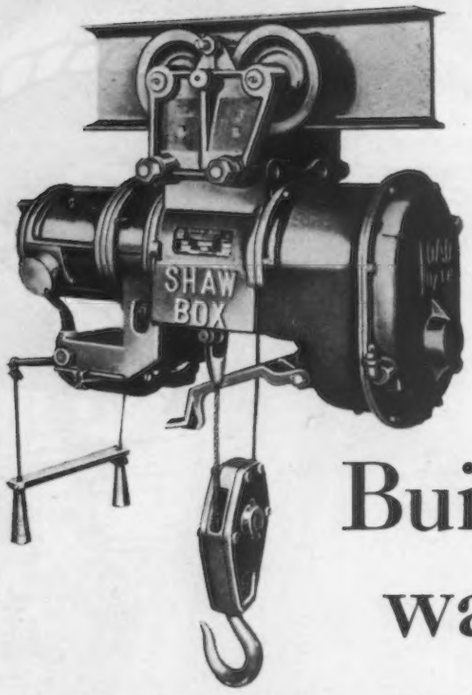
U.S. NAVY

WASHINGTON NAVY YARD USES HYDRO-BLAST AND SAVES 85% OF FORMER NEW SAND REQUIREMENTS

Behind the armed forces of the United States, stands an alert army of civilian engineers and mechanics who are determined that our boys shall "get there fustest with the mostest." And we might add "at the lowest cost." Toward this end, these men of vision search constantly for ways and means to do their jobs better and faster. That is why the management at the Washington Navy Yard were willing pioneers of *Hydro-Blast*. It is because of their vision and determination that Navy castings are cleaned *cleaner* and casting production cost is notably lower. Today, new core sand requirements at the Washington Navy Yard are 85% less than before *Hydro-Blast*. Sand that was formerly scrapped is recovered, washed and dried by *Hydro-Blast* at less cost per ton than it formerly cost to remove this same sand to the dump.

HYDRO-BLAST CORPORATION

3118 CLYBOURN AVENUE, CHICAGO, ILLINOIS



Built for war work

A SHAW-BOX 'Load Lifter' electric hoist was designed for tough, grueling work, long working days and indefinite years of hard service. This versatile hoist now takes on the extra burdens of all-out war production. It lifts most at the least cost due to its special features:

1. "One-point" lubrication.
2. Hyatt Roller Bearings and Ball Bearing Motor.
3. Safety upper stop; lower blocks; sure brakes.
4. Two-gear reduction drive; sealed against oil leaks; steel interchangeable suspension.

'Load Lifter' electric hoists are built with lifting capacities of 500 lbs. to 40,000 lbs. in all combinations required for industrial lifting necessities. They are adaptable to almost every working condition within their capacities. Send for Bulletin 350.

MANNING MAXWELL & MOORE INC. M&M TRADE MARK

'LOAD LIFTER' *Hoists*

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load-Lifter' Hoists and other lifting specialties. Makers of Ashcroft Gauges, Hancock Valves, Consolidated Safety and Relief Valves and 'American' industrial instruments.

War Needs Exceed 2d Quarter Capacity

Chicago

• • • **Despite record** breaking steel production, war requirements on orders rated A-10 or higher in the second quarter will exceed potential production in that period by some 17 per cent, Charles Halcomb, assistant chief of the Iron and Steel Branch of the WPB told local plant executives attending a priorities clinic here last week.

Halcomb explained that the Army, Navy and Maritime Commission were going over all their rated orders to determine which orders could be delayed so that no urgent requirements would go unfilled.

The finished steel picture for the second quarter of this year, as described by Halcomb, showed the following distribution:

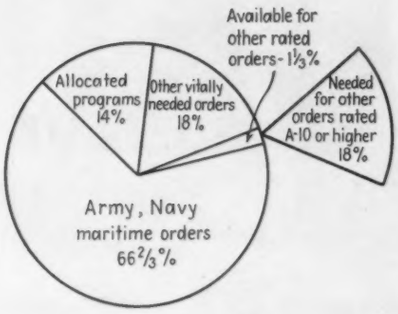
	Per Cent of Finished Steel Capacity
Army, Navy, Maritime Commission needs	66 2/3
Allocated programs (railroads, lend-lease, etc.)	14
Other vital needs (plant expansion, etc.)	18
Other orders rated A-10 or better	18
Total	116 2/3 per cent

These figures, Halcomb said, indicate why it was necessary to issue conservation order M-126, which prohibits the use of iron and steel in some 400 products.

The transformation of industry to war work after Pearl Harbor was dramatically illustrated by several charts which showed that on Oct. 10, 1941, priority rated orders represented 60 per cent of steel ingot production, while Army, Navy and Maritime needs accounted for only 20 per cent of output.

By Jan. 30, 1942, priority rated orders had increased to 90 per cent of ingot capacity, with Army, Navy and Maritime requirements rising to 40 per cent.

Despite the difficulty of supplying the needs of the Maritime Commission with plates for this year's ship program, the Commission has increased its ship goal to 15,000,000 tons of shipping in 1943. This 1943 goal will require 50 per cent more plate tonnage than this year's ship production, Halcomb said. Where this was to come from, he didn't know, except by reducing ship-


Available for other rated orders - 1⅓%
Allocated programs 14%
Other vitally needed orders 18%
Needed for other orders rated A-10 or higher 18%
Army, Navy maritime orders 66⅔%

ments for such purposes as railroad car building, and by reducing other plate uses of the armed forces.

The conversion of strip mills to plate rolling has about reached the limit, he said. Any further conversion would impede the flow of vitally needed heavy gage sheets for other purposes. Already difficulty has been experienced in supplying the sheet needed for drum making, black plate, etc.

Navy "E" Plants Can Now Shoot for Army "A"

• • • **The War Department** announced May 17 the creation of the Army "A" award, to be conferred upon war production plants and workers conspicuous for outstanding performance in Army production. The award will comprise an Army "A" flag for the manufacturing plant and a specially designed lapel button for each worker in that plant. An Army Board for Production Awards has been named to formulate policies and rules.

All Old Toothpaste Tubes To Be Handled by Newark Firm

Washington

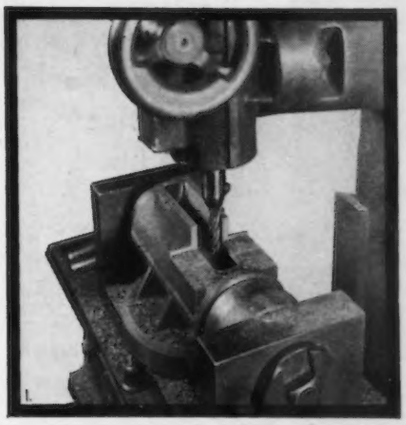
• • • **The Tin Salvage** Institute of Newark, acting as agent for the Metals Reserve Co., will be the only organization authorized to collect and salvage the tin tubes which consumers are required to turn in when buying tooth paste and shaving cream.

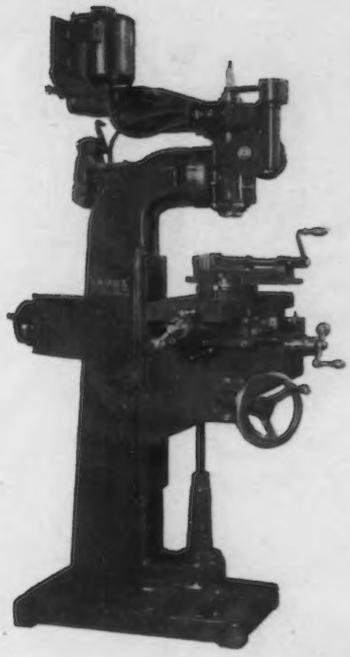
Meehanite License Granted

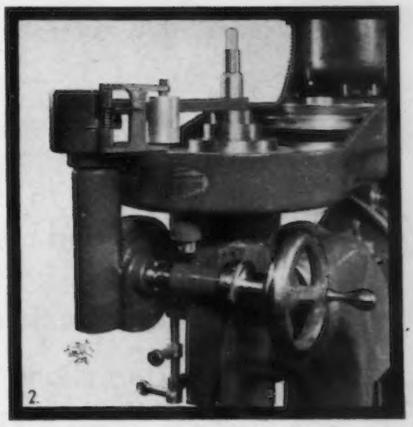
Pittsburgh

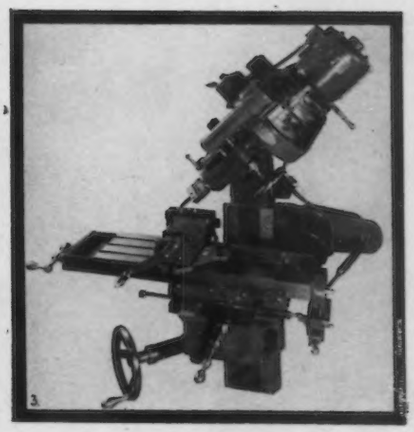
• • • **The Meehanite Metal** Corp. announces Otis Fensom Elevator Co., Ltd., Hamilton, Ont., has been granted manufacturing rights for Meehanite castings. The company is a part of Otis Elevator Co.

Interested in Bonuses?









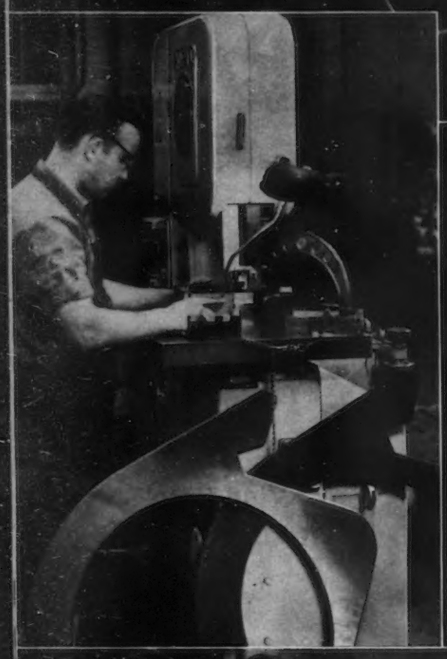
1. Precision end-milling
2. Power drive to spindle quill
3. Head swivels 90° each way

IF you bought this machine for end milling operations, *as hundreds have done,* you would get an efficient machine at a reasonable price because we designed it that way. » But as a bonus if you found *as hundreds have,* that this miller is also a fine precision jig borer—at no extra cost—wouldn't that be some bonus? » The 40-H Index Mill is an unusual machine at an unusually low price. We can't tell you in this space all the reasons why this machine does what it does, so why don't you write us for a bulletin describing this unusual machine in detail?

BLANK & BUXTON MACHINERY CO.
3100 EAST MICHIGAN AVENUE · · · JACKSON, MICHIGAN

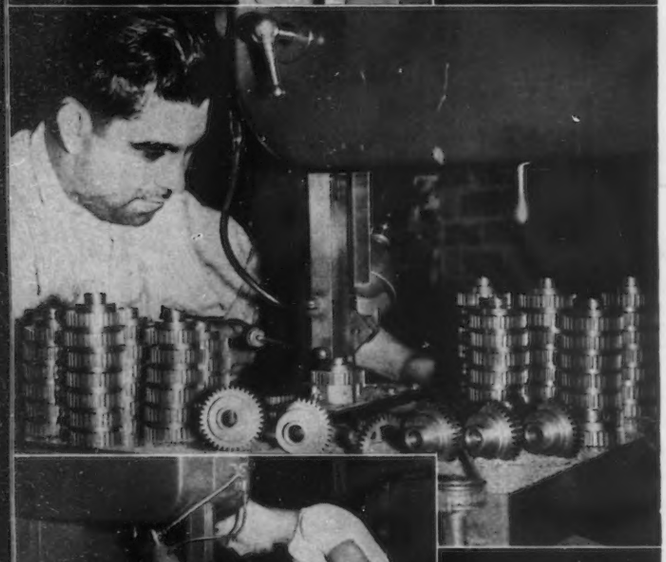
40-H INDEX

A Tried and Proven Machine for Milling, Drilling and Boring in the Tool, Die, Experimental and Production Shops



Variable pitch Propeller Blades made on the DoAll with great savings of time.

Special Parts made on the DoAll in a fraction of former time.



Sector Gears cut in 5 minutes each. Formerly took 30 minutes each on a miller.

Disc Rims polished on the DoAll in 2 minutes each. Formerly took 1 hour each by hand.

DoAll

• No, we don't need any more time. We have as much time as our enemies, but we do need *more production per hour*, and that's where the DoAll Contour Machine is doing such a magnificent job —knocking former shape cutting records into a cocked hat!

ON THE JOB 24 HOURS A DAY

In every modern plant from coast to coast, wherever war orders are going through on direct or sub contract, you'll find the DoAll doing all kinds of special production cutting, relieving $5,000 to $50,000 machine tools for other work.

★ ★ ★

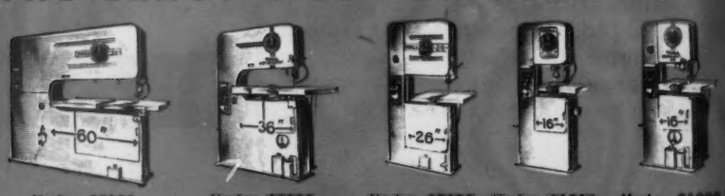
Don't care what the metal or alloy is—there's a DoAll band to do the job not only quicker, but smoother and better.

Fastest Precision Method to Remove Metal

For external and internal sawing of all metals and alloys (flats, blocks, bars, sheets or tubing)—for making special tools and parts without dies—for regular production work—investigate the DoAll, wonder machine of our day. There are 5 models with throat capacities ranging from 16″ to 60″, priced from $1000 to $5000, including motors.

Ask to have a factory-trained man call and show you how much time and energy a DoAll can save in your plant.

THE EXACT SIZE FOR YOUR JOB



Under $5000 | Under $3500 | Under $2000 | Under $1500 | Under $1000

All Models with Motors

PRODUCTION
TURNS MAN HOURS INTO MINUTES

Armor Plate ½" thick cut on the DoAll. Former method was torch and grinding off flash.

CONTINENTAL MACHINES, INC.

1311 S. Washington Ave., Minneapolis, Minn.

Associated with the DoAll Company, DesPlaines, Ill.

Manufacturers of Band Saws and Band Files for DoAll Contour Machines

NEW—Send for helpful book "DoAll on Production" for a bird's-eye view of real accomplishment.

Have you a Salvage Committee in your Plant?

The War Production Board, through its various scrap-collecting agencies, has recommended that every industrial company survey its scrap-producing potentialities.

Despite successful efforts to increase iron and steel scrap supply from automobile graveyards and other sources, it will still be necessary for industry to supply the bulk of the scrap needed to lick the Germans and the Japs.

Now is the time to appoint a committee to look over your plant and suggest old equipment, machines, dies, etc., that can be scrapped.

Your local scrap dealer will gladly quote on any material that will help to keep our iron and steel industry going at full tilt.

If your local community has not yet inaugurated a scrap collecting campaign, we suggest you start the ball rolling.

In calling this to you attention we are trying to do our part to cooperate with the War Production Board.

The
CHARLES DREIFUS
Company

Brokers in Iron and Steel Scrap for 40 years

Philadelphia, Pa.
Widener Bldg.
Rittenhouse 7750

Pittsburgh, Pa.
Oliver Bldg.
Atlantic 1856

Worcester, Mass.
Park Bldg.
Worcester 6-2535

24-hr. Week For Canadian Plane Plants Unlikely Now

Ottawa

• • • **Ralph P. Bell,** director general of the Canadian Aircraft Production Branch, stated there is no immediate prospect whatever for 24-hr. schedules, seven days a week in the Canadian aircraft industry. "Theoretically it is an ideal for which to strive," Mr. Bell said. "In the aircraft industry at the present time it is not only impracticable but impossible. Furthermore, if and when the time comes that it is practicable, it will involve the introduction of a swing shift, since experience in England has long since demonstrated that prolonged work on a seven-day a week basis does not pay. The question of whether or not the aircraft plants in Canada shall or shall not work 24-hr. a day, seven days a week, does not depend solely on whether or not the men and women operating these plants are prepared to work such schedules.

"Two other factors of at least equal importance have to be considered. The first factor is whether or not it is possible to procure for expanded production schedules adequate quantities of all of the materials and thousands of parts and accessories, of which there already is a shortage, and without which the manufacture of completely finished aircraft is possible. The second factor is whether an industry in which personnel has been expanded 40 times in the short space of three years has yet developed sufficient competent superintendents, foremen and lead hands to staff three shifts, as against two shifts.

Nickel Alloy Turnings To Aid Pig Iron Production

Cleveland

• • • **The increasing availability** of nickel alloy turnings, considerable amounts of which are being fed into basic iron furnaces, is expected to aid pig iron production. This practice will contribute toward production records at many blast furnaces. While the diversion of the material to blast furnaces might be considered a handicap to openhearths sadly in need of scrap, the alloy turnings are said to be better suited for blast furnaces, and the additional basic iron produced will eventually be fed into the open hearths.

May iron output is likely to drop below the April total, because of interruptions for repairs.

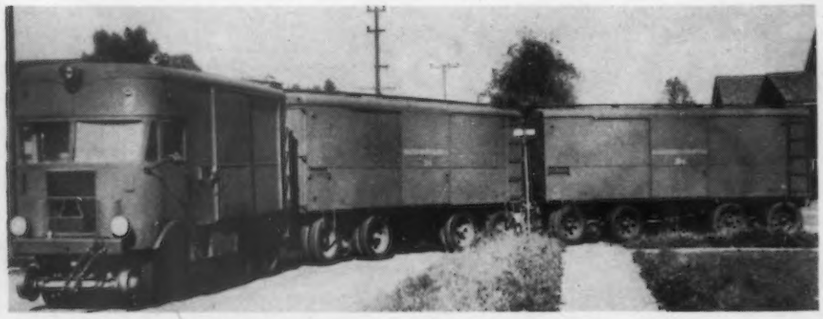
Steel Castings Bookings And Output Rise in March

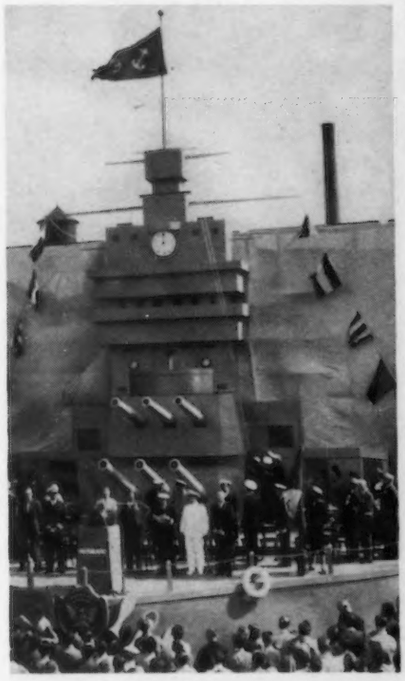
• • • **Orders booked** for steel castings during March amounted to 211,081 tons, compared with 179,880 tons in February, 1942, and 126,140 tons in March, 1941. The production of steel castings amounted to 146,507 tons in March, as compared with 133,726 tons in February, 1942, and 95,185 tons in March, 1941, according to Director J. C. Capt, Bureau of the Census, Department of Commerce.

The rated monthly capacity reported for 1942, 1941 and 1940 is 117,039 tons normally devoted to castings produced for sale as such. Of this capacity 46,816 tons are usually devoted to railway specialties and 70,223 tons to miscellaneous castings.

42-WHEEL AUTO-TRAIN: This new type vehicle was completed recently by Evans Products Co. for delivery to an undisclosed ordnance plant. It is adapted to rails by lowering steel flanged wheels which serve merely as guides. The rubber tires run on the tracks. Gross capacity of the train is 90,000 lb.

Press Association Inc.





U.S.S. INDUSTRY: This unusual land battleship provided the background for ceremonies attending the recent awarding of the Navy "E" burgee to the Automatic Transportation Co., division of Yale & Towne Mfg. Co.

Need For Speed Hits Barge Canal Movement

Buffalo

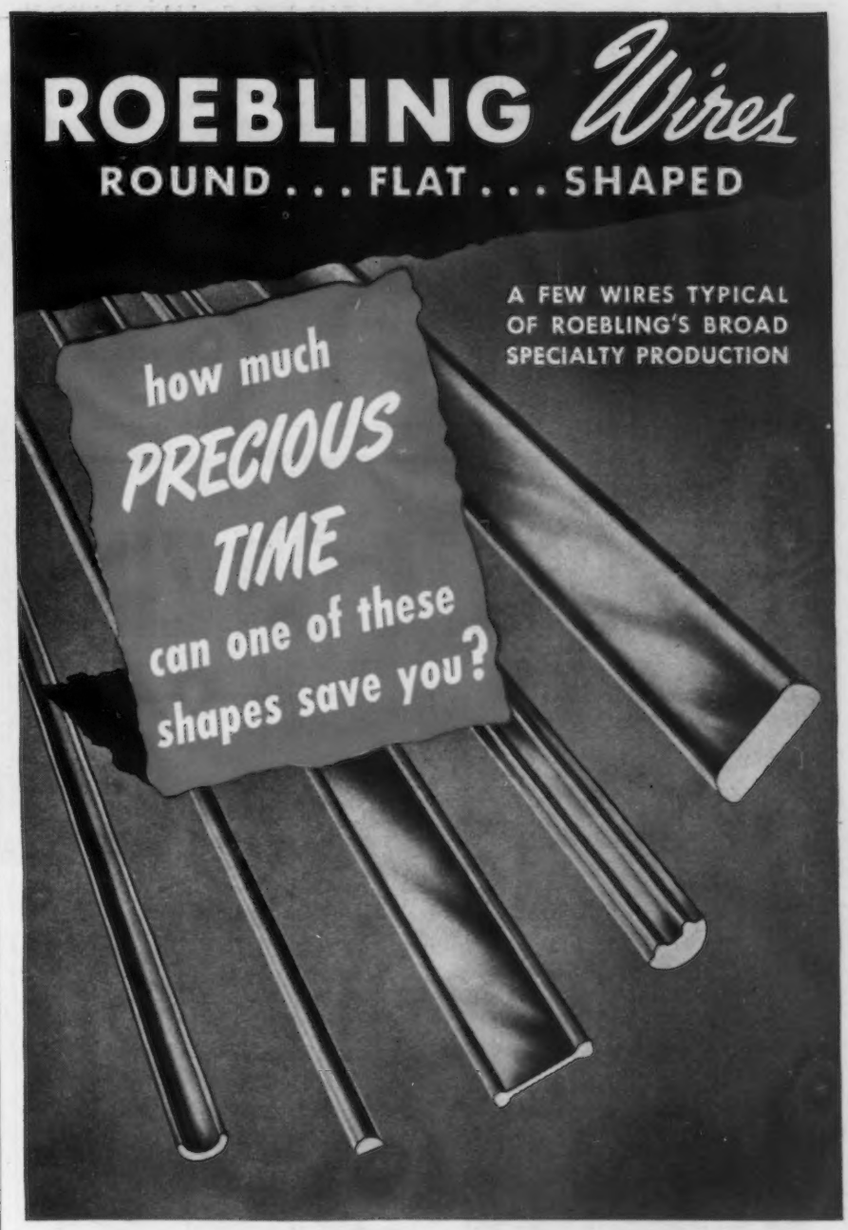
• • • **Practically no steel** is being moved to New York over the Barge Canal from Buffalo this year, compared with the heavy shipments that cleared for the seacoast in 1941. In previous years steel billets were shipped to eastern wire mills for fabrication, but practically all of this steel now moves by rail because of the greater speed.

The westbound movement over the canal, which formerly included flaxseed from the Argentine and sugar, now is confined largely to scrap steel for Buffalo or Fort Erie, Ont.

Crosley Buys Cincinnati Plant

Cincinnati

• • • **The plant** and equipment of the G. & G. Mfg. Co., Cincinnati, makers of tools, dies and metal stampers, was purchased last week by the Crosley Corp., according to Raymond C. Cosgrove, executive vice-president of Crosley.


ROEBLING Wires
ROUND . . . FLAT . . . SHAPED
A FEW WIRES TYPICAL OF ROEBLING'S BROAD SPECIALTY PRODUCTION
how much PRECIOUS TIME can one of these shapes save you?

The right special shaped wires can save you hours of time—*time that's vital.* Making them is a specialty. Some users demand toughness and resiliency . . . others uniform temper held within close limits . . . still others, ability to withstand severe strains. But they *all* require steel of uniform analysis, dimensions and finish.

Are your round, flat or shaped wire requirements in this "tough" class? If so, put the job up to Roebling! We have the skill, experience, and facilities to help you "beat the quota."

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, NEW JERSEY • Branches and Warehouses in Principal Cities

Complicated Job Is Broken Into 30 Easily Learned Ones

• • • **Hand filing operations** which previously have been done by skilled tool makers have been broken down into simple operations so relatively unskilled workers can be trained to do the job.

In the plant of Willys-Overland Motors, Inc., the part formerly required about 30 hours time, with a skilled tool maker doing the job after machining had been finished. The new technique makes use of approximately 30 men, each of whom files on a designated small part of the whole job, becoming very proficient on this limited operation within 30 days. On the basis of 10 guns a day, the initial requirements called for 300 hours of filing, or the work of 37.5 tool makers, all of whom would be very difficult to get.

ECONOMIZE ON ZINC

with

MEAKER PROCESS

for Electro-Galvanizing Wire

Even the lightest coatings are uniformly distributed on the wire surface. Control of coating thickness is exact. You can save on zinc, produce more perfect coatings, make more profit with Meaker Process for Electro-Galvanizing Wire.

"A proven success by every test"

WE INVITE YOUR INQUIRY

The MEAKER Company

1635 South 55th Avenue, Chicago

British-Combine Photo

"EXPORTS" TO GERMANY: These 2000 lb. demolition bombs, which form the cargo for a Manchester super-heavy bomber of the RAF, are destined for Axis held territory where the RAF is now making regular deliveries in the places where they hurt most.

Crown Cap Manufacturers May Obtain Black Plate

Pittsburgh

• • • **On requirements** that have been approved by WPB, an A-1-a rating has been assigned orders for black plate to be used in the manufacture of crown caps, but suppliers of such plate must have a certification from the customer before filling such orders. Action was also recently taken on black plate for enclosures used in food packing.

Monarch Votes Dividend

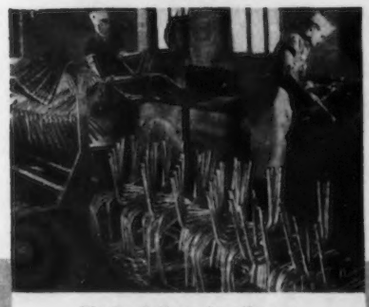
Sidney, Ohio

• • • **Monarch Machine Tool Co.** has declared a dividend of 75c. per share on the company's common stock, payable June 1, 1942, to stockholders of record at close of business May 22.

SUPERIOR CAN DO IT!

We shear, form and stamp sheets up to 54 x 144 in., 10 to 24 gauge.

Spot Welding up to 42 inch throat.



Electroplating—lengths up to 10 feet.

The Men, the Machines and the EXPERIENCE

• *Ready now* to produce your sheet, tube or wire fabrication job, quicker—better—more economically. Production runs of custom designed products are properly placed here—they have always been a large part of our business.

Our men, our machines, and our *experience*—are grooved to furnish the speed, volume and skill you need. On that basis . . .

We Invite Your Inquiries for

Complete fabrication of sheets, tubes, bars, angles, flats, and wire; Enameling and baking; Electroplating; Woodworking; Upholstering.

Send Blue Prints or Samples for quotations and deliveries.

Torch and Arc Welding on production basis. Butt Welding.

Production-run Assembly. Riveting (also automatic.)

Sprayed and Dipped Finishes. Bake ovens up to 7 x 7 x 20 feet.

SUPERIOR SLEEPRITE CORPORATION·CHICAGO

One of the Nation's Largest Peacetime Manufacturers of Metal Furniture

Daily Pig Iron and Ingot Output At C-I Peak

Pittsburgh

• • • **Carnegie-Illinois Steel Corp.** announced May 15 that daily average production of 47,069 tons of pig iron and 62,224 tons of steel ingots during April exceeded any previous performance. Steel plates for ships were featured in the new output records established last month.

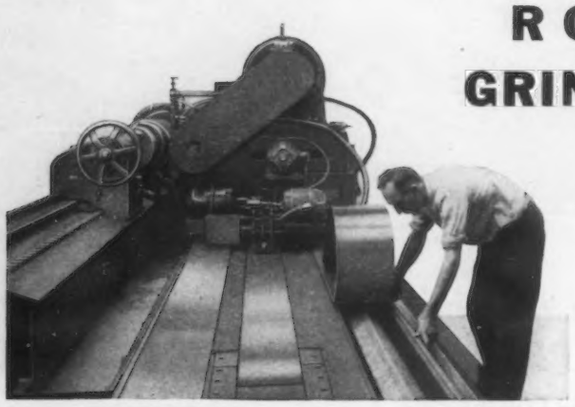
Among numerous new records was one by the 140-inch plate mill in the Pittsburgh district, which exceeded the previous record attained in March of this year.

Another Pittsburgh district record was established during the month when Carrie blast furnace No. 4 produced 36,200 net tons.

Carnegie-Illinois also set new marks in the Chicago district, when a world's record was established at a 160-inch plate mill. A new record was established at a Gary open hearth department, consisting of three tilting furnaces, which in April produced 81,330 net tons.

INVERTED "V" WAYS *Contribute to High Precision and Productive Capacity of*

FARREL ROLL GRINDERS



The inverted "V" ways of Farrel Heavy Duty Roll Grinders are an important factor in the smooth, accurate, uniform traverse of the carriage, so necessary for precise roll contour and high quality finish.

Cast separately from the bed and made of a special alloy iron of unusual hardness and close grain, these inverted "V" ways are exceptionally resistant to wear. In addition, the ways are made with a large area of bearing surface which makes the unit pressure low, still further retarding wear and lengthening their accurate life.

Automatic flood lubrication, supplied in a continuous cycle by a separate motor-driven oil pump, cleanses them of foreign matter which might settle on them. Double protection is afforded by the flexible metal guards which fit closely over the way channels to exclude dirt and grit.

The inverted "V" ways are but one of the many features of Farrel Heavy Duty Roll Grinders that contribute to the high accuracy and high productive capacity of these precision machines. Full details are given in our Bulletin No. 111, which will be sent free on request.

FARREL

FARREL-BIRMINGHAM COMPANY, Inc.
ANSONIA, CONN.
New York • Buffalo • Pittsburgh • Akron • Chicago • Los Angeles

Cleveland Pneumatic Tool Plant Grows 1000% in 3 Years

Cleveland

• • • **The Cleveland** Pneumatic Tool Co. has increased its personnel a third since Pearl Harbor, and expects to more than double its present force. The company has expanded its original plant by about 1000 per cent in the last three years. A new plant will be built for the company's recently formed subsidiary, Cleveland Pneumatic Aerol, Inc.

The company has trained all its new employees under its own system, requiring 4 to 8 weeks' study by trainees. Plans are under way for the training and use of women in production work. Two shifts work 11½ hours each six days a week, and 8 hours on Sunday. To combat fatigue and absences, a stagger system of holidays has been arranged.

Of the company's four divisions, its landing gear unit, is under most pressure from the war effort, with riveting, automotive, and rock drill divisions in that order in importance.

FOR THE JAPS: These torpedoes. being repaired in a Pearl Harbor torpedo base, may some day stop a Jap transport or warship. These men are working on the propulsion end of the "big fish." the striking end not being shown in the photo.

AP Photo

Helpful "Staff Work"

IN THE BATTLE OF PRODUCTION

All over America, engineers and production men are converting plants to war needs. These men know they can... upon request... get helpful suggestions from us about ways to speed up the working of metals and alloys.

This helpful information has been mobilized into convenient charts, pamphlets and other printed pieces. These tools-in-type range from technical data for engineers to simplified reports on performance of alloys containing Nickel under specific operating conditions.

Here, also, are correlated latest reports from the field about selection, fabrication and uses of ferrous and non-ferrous Nickel Alloys.

And, as further support for your battle of production, we offer personal assistance from members of our technical staff. With recent experience in many plants facing materials difficulties, these men become especially helpful. During wartime, Nickel... and information about Nickel... must go where it best serves the United Nations.

☆ ☆ *Nickel*

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK, N. Y.

NEW
Cable-Cored V-BELTS
WITH
NEW BLACK JACKETS
"Neutralized" Cable-Cores
Uniform Flexibility
Tailored to the Grooves
New, groove-gripping jackets. Cable-like cords in neutral section with a special extensible section above and compression section below — belts cured in precision molds.
Sheaves
Medart Sheaves have smooth side, correct size V-Grooves for a balanced, smoother running V-Drive.
MEDART-TIMKEN
PILLOW BLOCKS
"SS" and "TS"
"DM" and "DC"
Medart-Timken Type "SS" and Type "TS" Bearings —straight and taper sleeve—are self aligning in both Non-expansion and Expansion Types . . . The Straight Sleeve Type is adapted to general purpose applications—wherever minimum friction is desired in the mechanical transmission of power . . . The Taper Sleeve Type is suited to high speeds and shock loads
GEARS ! Any Kind

WE Train Power TO WORK FOR YOU MORE EFFECTIVELY

Now as never before you must make the most of every piece of equipment. Why not let us help you? Our line of complete power transmission equipment . . . . our 60 odd years of experience . . . our staff of expert transmission engineers — All are at your service.

• • •

GET CATALOGS

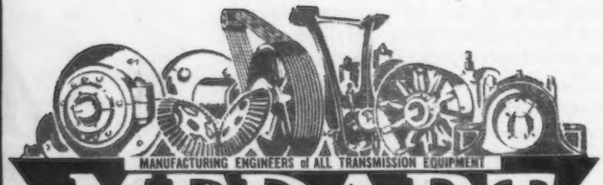
No. 56-V: V-Belts and V-Sheaves

No. 56-G: Gears and Sprockets

No. 66: All Other Power Transmission Equipment

For Power Travel at Reduced Rates

POWER TRANSMISSION ENGINEERS



MANUFACTURING ENGINEERS of ALL TRANSMISSION EQUIPMENT

MEDART

3520 DE KALB STREET • ST. LOUIS, MISSOURI

Sales Offices in All Principal Cities

WPB Forms Protection Board For War Plants, Resources

Washington

• • • **A Resources Protection** Board which will evaluate the wartime importance of all industrial plants, war facilities and economic resources and make recommendations for their protection has been named by WPB Chairman Donald M. Nelson. William K. Frank of the Production Division of WPB was appointed chairman of the new organization.

The new board will cooperate closely with the Army, Navy and Maritime Commission. Hazards to be considered include bombing, sabotage, espionage, invasion, fire and floods.

Other members of the board include: Col. Carl G. Richmond, War Department; Joseph Fennelly, Navy Department; Philip Bastedo, OCD; and William J. Kearny, materials division. Emerson Ross of the statistics division is director of resources analysis. James W. Fesler of the Office of the Executive Secretary of WPB is secretary.

National Metal Show Planned For Cleveland, Oct. 12-16

• • • **The War Production** Edition of the National Metal Exposition will be held in conjunction with the National Metal Congress in Cleveland's Public Auditorium during the week of Oct. 12 to 16, instead of in Detroit, as previously scheduled. The exposition will devote demonstration clinics to increased production, planning, engineering, improvement of materials, job training, conservation, substitution and maintenance. The American Welding Society, the Wire Association and the Iron and Steel division and Institute of Metals division of the American Institute of Mining and Metallurgical Engineers, will cooperate in the exposition.

Silver For Tin in Solder

Buffalo

• • • **Silver** is being substituted for tin in metallic alloys used for soldering, President Fletcher W. Rockwell, of National Lead Co., said during a visit here last week. Large quantities of the solder, with a silver content, are being used in the aircraft and other war industries, he said.

Low Grade Materials Must Be Used, Foundrymen Told

Birmingham

• • • **Due to the shortage** in critical materials foundries must utilize many low grade materials which under normal circumstances would not ordinarily be considered suitable for the production of iron, Frederick W. Hanson, metallurgist at the company's Birmingham office for Electro-Metallurgical Co., said May 15 before the Birmingham Chapter, American Foundrymen's Association. It is possible, he said, to go a long way in reconditioning these materials to produce satisfactory castings. Accurate records should be kept, he said, so irregularities may be traced to their source. He pointed out that irons which would normally be unmachinable due to the presence of chromium, may be treated with alloys of the silicon-manganese-zirconium type and effectively softened.

American Bridge to Build Boats at Pittsburgh

Pittsburgh

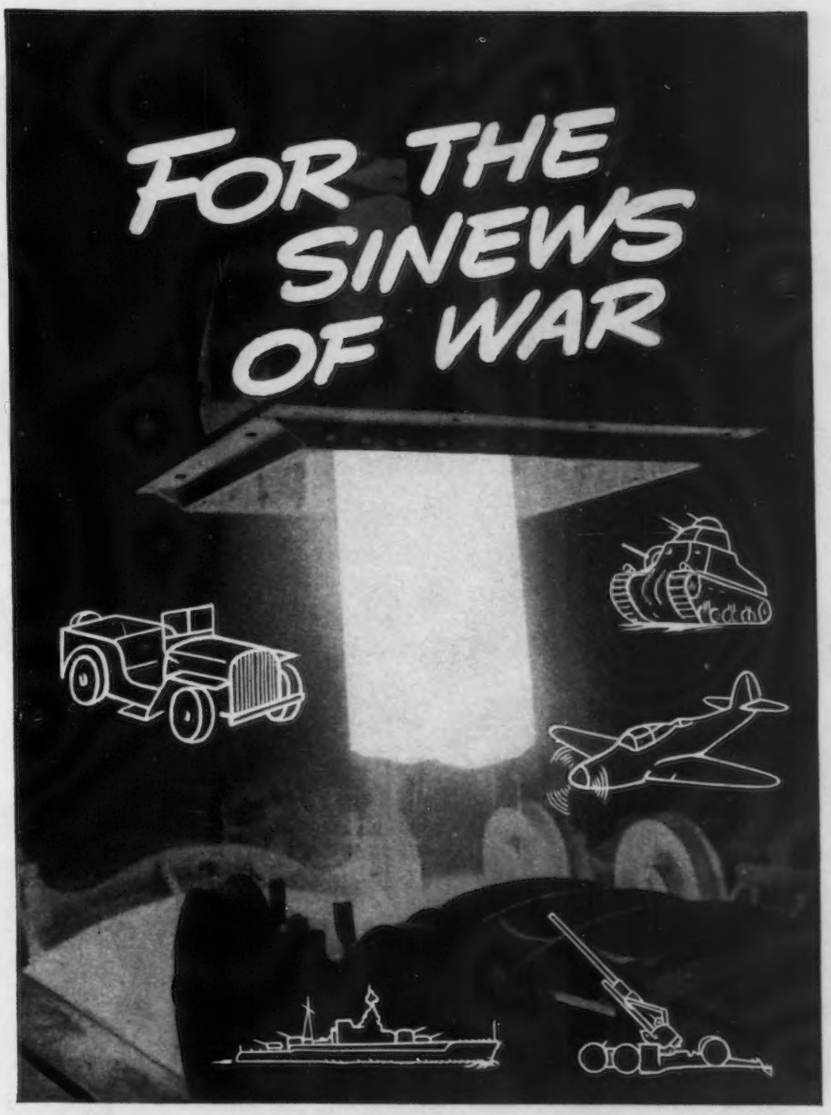
• • • **This district** will soon have a new war plant, the estimated cost of which will be $8,500,000 and which will be utilized for the construction of a number of special purpose craft for the Navy, according to L. A. Paddock, president, American Bridge Co.

A modern fabricating plant for the construction of hulls with other units such as office buildings, shops, warehouses, and fitting out docks, is being built adjacent to one of the company's plants in the Pittsburgh area.

The new facilities will be wholly owned by the Navy and operated by American Bridge Co. under lease. Construction is to proceed at top speed.

Allegheny Ludlum Produces Movie Short on Alloy Steels

• • • **"There's a Job to be Done,"** a movie short, showing the vital role of alloy steels in the war, has been produced by Allegheny-Ludlum Steel Corp., Pittsburgh, and is being shown to Pittsburgh movie audiences. The film, which opens and closes with a speech by Donald Nelson, will be shown throughout the country.



Here at Andrews every billet, bar and slab is earmarked for the sinews of war. Working around the clock, seven days a week, Andrews is solidly entrenched in the front lines in the battle of production.

And while speed is the first consideration, vigilance in maintaining Andrews quality is never relaxed. Months before conversion into billets, bars or slabs, raw material comes under the minute, exacting control of Andrews metallurgists. This results in the complete elimination of guesswork; an unfailing guarantee of quality; the assurance that Andrews users enjoy the safeguard of a wholly dependable source of supply.

THE ANDREWS STEEL CO.
NEWPORT, KENTUCKY
DIVISIONS
THE NEWPORT ROLLING MILL COMPANY
THE GLOBE IRON ROOFING & CORRUGATING CO.

Basic Open-Hearth Alloy Steel Billets and Slabs

Rapid Driving • No Slipping • Better Holding = 50% Less Assembly Time with Phillips Screws

Here's the formula for doubling fastening schedules: Replace slow-driving slotted screws and awkward hand-driving methods with Phillips Recessed Head Screws and pneumatic or electric drivers. Phillips screw and driver fit as one, making easier, fumble-free driving with no danger of driver slipping from recess to mar surface or cause injuries.

Slotted screw bottlenecks — crooked screws — split heads — burrs — all the slotted screw headaches that waste so much time and effort are eliminated. Work goes smoothly when you replace snail-paced slotted screws with lightning-fast Phillips screws.

You'll discover you get 2 hours work done in one — with a 50% saving in *cost* as well.

Contact companies listed below for further facts.

19 SOURCES of SUPPLY

PHILLIPS RECESSED HEAD SCREWS GIVE YOU 2 for 1 (SPEED AT LOWER COST)

WOOD SCREWS • MACHINE SCREWS • SHEET METAL SCREWS • STOVE BOLTS • SPECIAL THREAD-CUTTING SCREWS • SCREWS WITH LOCK WASHERS

American Screw Co., Providence, R. I.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N.H.
The Charles Parker Co., Meriden, Conn.
Parker-Kalon Corp., New York, N.Y.
Pawtucket Screw Co., Pawtucket, R.I.
Pheoll Manufacturing Co., Chicago, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N.Y.
Scovill Manufacturing Co., Waterbury, Conn.
Shakeproof Inc., Chicago, Ill.
The Southington Hardware Mfg. Co., Southington, Conn.
Whitney Screw Corp., Nashua, N.H.

WPB Decentralization Seen In New Regional Office Setup

Washington

• • • **In a move to** decentralize the War Production Board, 13 regional offices vested with broad authority have been set up throughout the nation. The new set up, in line with the general policy to decentralize WPB operations as much as possible, involves two documents, (1) a general administrative order formalizing the 13 regional offices, and (2) a set of administrative instructions outlining the functions and duties of the regional directors.

The regional offices shall provide the focal point in each region for all WPB business, and the regional director will be the representative of the chairman of WPB within the region. It is intended that decentralization of the WPB activities shall be developed to the end that, so far as practicable, the work of the Washington organization shall center in policy determination, program planning, institution of major procedures and general coordination, while the day-to-day operations shall be conducted through the regional offices.

The 13 regional offices established are:

Region No.	City	Region No.	City
1	Boston	7	Kansas City
2	New York	8	Dallas
3	Philadelphia	9	Denver
4	Atlanta	10	San Francisco
5	Cleveland	11	Detroit
6	Chicago	12	Minneapolis
		13	Seattle

William Adams Named Head Of WPB Furniture Branch

• • • **Appointment of William A. Adams** as chief of the furniture and bedding branch of the bureau of industry branches was announced today by Philip D. Reed, bureau chief. Mr. Adams has been deputy chief of the branch since Feb. 8. He came to Washington in August, as a member of the OPA liaison group on defense housing.

For the last ten years Mr. Adams has been consultant to the construction, aircraft and chemical industries, with his own office in New York. He was also executive director of the New York City Citizens' Budget Commission.

John M. Brower, retiring chief of the branch, will continue to serve as chief technical consultant.

WPB Construction Functions Consolidated in New Bureau

• • • **Organization of a** construction bureau consolidating the construction functions of the War Production Board was announced May 12. William V. Kahler, on leave as chief engineer of the Chicago area, Illinois Bell Telephone Co., and since May, 1941, head of the construction branch, production division, will be chief of the new bureau, and a member of the plant site board.

The Bureau will recommend construction project priority ratings, attempt to conserve essential materials, and administer conservation order L-41, placing all private construction under rigid control.

The consolidation makes it possible for all construction applications except those of the Army and Navy, to be handled by a single WPB agency. The government requirements branch, now under the direction of Maury Maverick, will continue to have all contacts with federal, state and local government agencies in regard to their construction projects. The procedure for handling publicly and privately financed defense housing is not affected by the consolidation, but the housing branch in the division of industry operations, under Sullivan Jones, which recommends the assignment of priority ratings to such projects, is transferred to the new bureau.

Trade Notes . . .

Diamond Saw & Stamping Works, Inc., Buffalo, has changed its name to Diamond Saw Works, Inc. The company discontinued metal stamping in 1898.

•

The Safway Steel Scaffolds Co. of Wisconsin, Inc., Milwaukee, has changed its name to Safway Steel Products, Inc.

•

Graff & Co., Chicago, has purchased the machinery and equipment of the Bower City Machine Co., Janesville, Wis., and has moved it to Chicago.

•

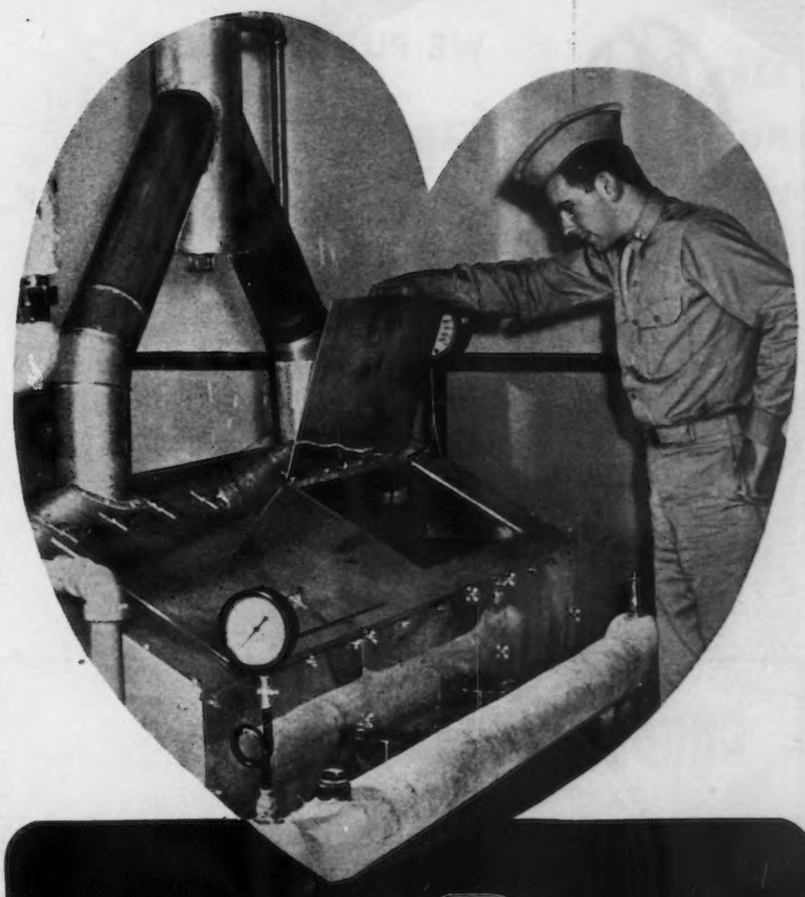
The Wausau Engineering Co., headed by Ralph C. Kaser, Cleveland foundry official, has been established at Wausau, Wis., in a new plant for manufacturing special machinery.

•

Metal-Mold Magnesium Corp., Cedarburg, Wis., has been organized as a smelting plant by J. Ernest Kauffmann, Peter J. Watry and M. C. Watry.

•

Detroit Stamping Co.'s eastern sales representative, John F. Diehl, has opened a warehouse at 210 East 34th Street, New York, to stock De-Sta-Co toggle clamps, manufactured by the Detroit company.



T. N. T.
IS A "SOFTY" AT HEART!

This is not recommended for setting-up exercises; yet T.N.T. is no nightmare to careful ordnance men. Ordinarily before it gets tough and lets go T.N.T. must be prodded with a primer and a fuse.

The carefree stance of this officer is no stage prop. He's accustomed to watching a T.N.T. melt unit change the explosive mixture from granular to liquid form. And in this important war job ARMCO Stainless Steel has a big role.

Many melt units and vent pipes like this are made of ARMCO Stainless. The giant vat "babies" T.N.T. — cradles it in a gentle rocking motion before the liquid is poured into deadly shells to solidify.

ARMCO Stainless Steel is used in T.N.T. melt units for the same reason it was used in many peace-time products. It assures *complete corrosion resistance.* T.N.T. comes out uniformly pure. No rust or impurities mar its explosive power. The American Rolling Mill Company, 1921 Curtis St., Middletown, Ohio.

TO KEY MEN: Ask Us for Sheet Metal Working Data on War Products and Post-War Products

MADE OF ARMCO STAINLESS STEEL

WE PUT THE KIDS TO BED IN 1865!

Atop the roof of the Dunbar spring plant is perched a bell . . . summoning the workers in the morning . . . sending them home at night. This bell also performs a community service . . . for, rung 99 times at nine in the evening, it sends all children home and to bed. The bell still rings . . . the tradition almost forgotten. But the tradition of fine workmanship still goes on in the hands of another generation of spring-makers, whose talents are actively engaged in helping to meet the crisis of 1942.

1865 SINCE 1845

1942

Dunbar Bros. Co., Bristol, Connecticut

DIVISION OF ASSOCIATED SPRING CORPORATION

SAVE YOUR CUTTING TOOLS WHILE USING THEM!

Save the cutting tools you're using by prolonging their useful life. This will help to compensate for some of the tools you can't get, even though you have money in the bank.

And saving your cutting tools while using them needs a dependable supply of coolant. In these days of 24-hour operation, manufacturers are using more Ruthman Gusher Coolant Pumps than ever before.

Gusher Pumps are designed for continuous operation—Scarcely a production shop carries a spare part for Ruthman Pumps—That means they are built right from the start.

The RUTHMAN Machinery Company CINCINNATI OHIO

Coveted Navy "E" Earned By Staten Island Shipyard

• • • **As several thousand** shipworkers changed shifts at the Staten Island shipyard of Bethlehem Steel Co. on May 9, they paused to witness the half hour ceremony of the presentation to the yard of the Navy "E" burgee. The award was more than a tribute to the company, but was also commendation to the competence and application of every man from the laborer to the yard manager for doing a fine job.

At the ceremonies, the presentation of the lapel button was made to two of the yard's employees by Capt. J. M. Irish, U. S. Navy, supervisor of shipbuilding. M. P. Neary, oldest employee and foreman of the plate shop and bending shed, was one of the employees selected for this honor, and the other was C. J. Anderson, an apprentice chosen by lot. Neary went to work at the yard in 1899 and is 73 years old.

Addresses were made by Rear Admiral George H. Rock, C. C., U. S. Navy (retired), A. B. Homer, vice-president of Bethlehem Steel Co., Captain Irish, and G. H. Bates, general manager of the company's New York yards. Mr. Bates mentioned the destroyer recently delivered to the Navy that was so well constructed that its performance alone went far toward earning the burgee. He commended the men on their fast, efficient manner of doing things and urged them to continue to turn over more and more ships to the fleet.

Taxes, Uncertainties, Halve Republic's July Dividend

Cleveland

• • • **New tax laws,** possible wage increases, and the need for maintaining working capital were the explanation given by T. M. Girdler, chairman of Republic Steel Corp., for the reduction in the dividend declaration on the common stock from 50c. paid on April 2, to 25c. payable July 2. Mr. Girdler said that the change in the dividend declaration should not be construed as establishment of a regular rate at a lower level, since future declarations will depend upon the uncertainties mentioned.

Plate Rolling Crowds Highly Rated Sheets

Pittsburgh

• • • **With more and more** rolling space on large continuous sheet mills being utilized for plate production, the WPB is now facing the difficult problem of retaining enough space on these units to take care of certain highly rated sheets, as well as cold reduced black plate used in making tin plate.

It is believed the situation has reached the point where the WPB has under active consideration a plan for mandatory control over the production of tin plate similar to that now exercised over plates and pig iron. Such mandatory control which seems to be imminent would mean that tin plate rolling schedules would be submitted to WPB in advance of actual production so that changes, if warranted, might be made in the companies schedules by WPB.

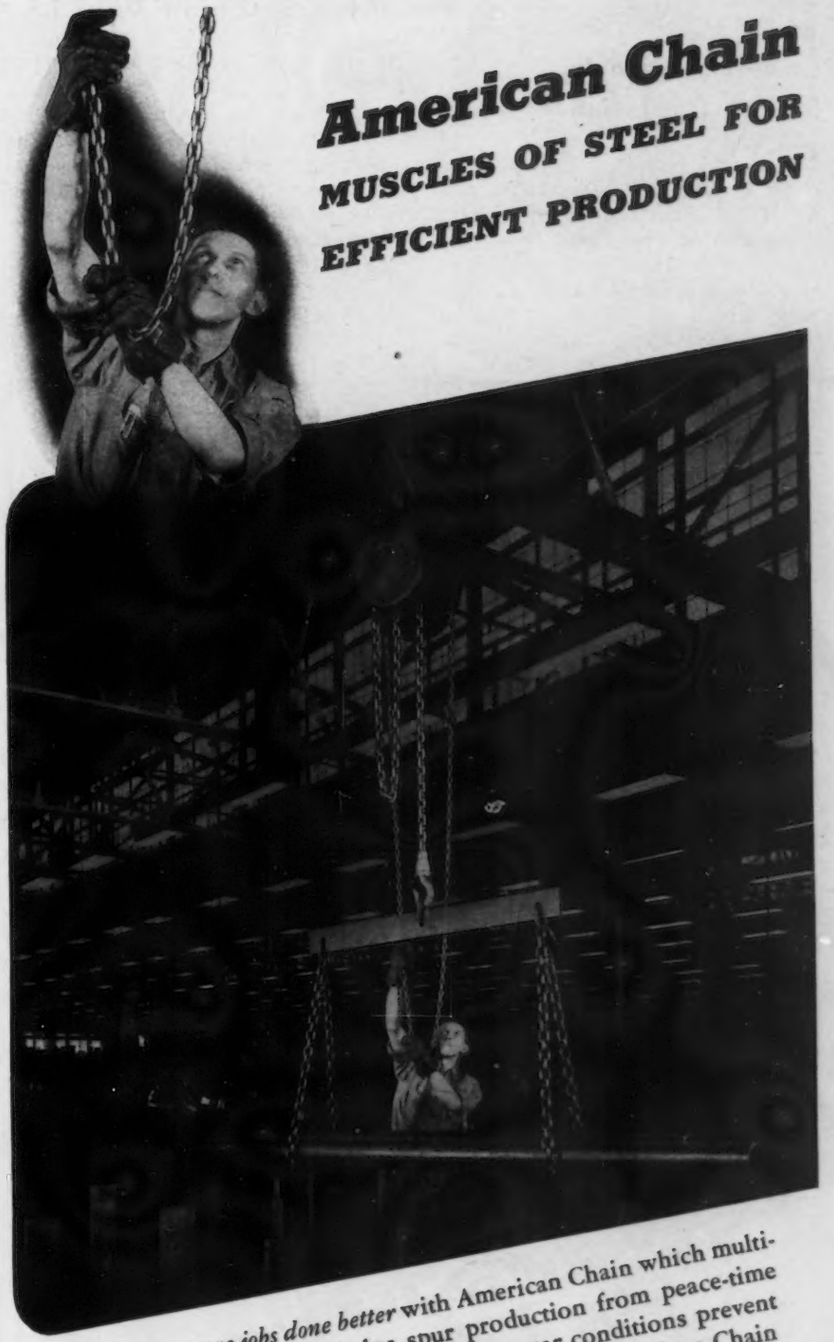
That some similar treatment is also under study for sheets and strip seems to be indicated by the close scrutiny which WPB is giving sheet rolling schedules from many steel companies. Many concerns are now submitting a complete schedule of sheet rollings and shipments to WPB for informative purposes.

It is believed that the mandatory plan now under study for the control of tin plate production is part of a major step to make sure that as many steel slabs as possible throughout the country are utilized for plate production and at the same time assure strategic and necessary tin plate output. As the matter stands now, there is a chance that tin plate production might be interfered with since approximately 90 per cent of the latter is made from cold reduced black plate, a product of the wide continuous mills.

Freight Car Service Increased

Cleveland

• • • **About 60 per cent** more freight service was obtained from each railroad car in use in 1941 than in 1917 to 1918, according to the Cleveland Trust Co. The study blames rationing on the shortage of transportation facilities, including trucks and ships, rather than on shortages of commodities.



American Chain
MUSCLES OF STEEL FOR EFFICIENT PRODUCTION

★ Men get *more jobs done better* with American Chain which multiplies muscle power and helps spur production from peace-time routine to war-time peak levels. ★ Since war conditions prevent immediate shipment of some types and sizes of American Chain we suggest you plan to get the most work out of every foot of chain you now have. ★ Consult your mill supply distributor on how to *select, apply, use, inspect* and *maintain* your chain. He will help you make your present chain last longer. And you may be sure he will ship your orders for American Chain as fast as his inventories permit.

AMERICAN CHAIN DIVISION
York, Pa., Boston, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco

ACCO

AMERICAN CHAIN & CABLE COMPANY, Inc.
BRIDGEPORT · CONNECTICUT

Impetus Given to Duplexing Methods

Pittsburgh

• • • **In an effort** to increase production by cutting down melting time and at the same time considerably reduce peak load electric requirements, impetus has been given to the duplexing of metal in the production of electric steel.

At least one major company for the last year or so has been duplexing metal in open hearths preparatory to final refining in the electric furnace but recent moves indicate an increase in the use of hot metal for electric steel production.

It is understood that Republic Steel Corp. in the DPC project at Chicago calling for nine electric furnaces will supplement these units with several tilting open hearth furnaces which will be utilized in duplexing metal for the electric furnace consumption.

It is also reported that Copperweld Steel Co. at Warren, Ohio, has under active consideration, subject to governmental approval and assistance, a program calling for additional electric furnaces, a bessemer converter, and cupolas. It is said that pig iron will be melted down in the cupolas, transferred to the bessemer converter, and, after blowing, sent to the electric furnaces.

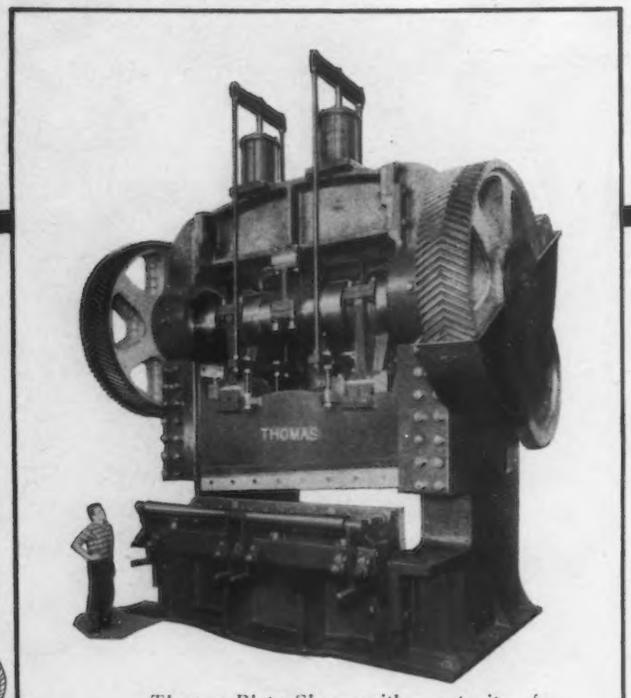
The high temperature of the duplex metal is such as to reduce considerably the amount of power required in electric furnace operation than when a cold charge is used. While it is believed that the absence of sufficient quantities of power may have been responsible for increased use of duplexing, it is also true that in most areas the cost of electric power is predicated on the peak load. The latter in the duplexing of the metal would be reduced considerably and thus establish a higher load factor. There are other quarters which contend that the possible lack of sufficient heavy scrap in the future has also contributed to the plans for increasing the duplexing of electric steel. It is reported also that a few other companies have similar plans in the active stage.

Pipe Fittings Standards Ready

• • • **Printed copies of** Simplified Practice Recommendation R185-42, Pipe Fittings, are now available, according to the Division of Simplified Practice, National Bureau of Standards. This recommendation covers threaded or flanged gray cast iron, malleable iron, and brass or bronze pipe fittings, except hydraulic or high-pressure pipe fittings, cast or forged steel fittings, and brazed or soldered brass or bronze fittings, whether screwed or flanged at any outlet.

Files, Rasps to be Simplified

• • • **The standing committee** of the files and rasps industry has proposed a revision of Simplified Practice Recommendation R6-40, Files and Rasps, according to the Division of Simplified Practice of the National Bureau of Standards.



Thomas Plate Shear, with a capacity of 3" x 120" slabs and sheets

PRESSES • DIES • METAL-FORMING MACHINERY

BENDING AND STRAIGHTENING MACHINES • MULTIPLE DRILLS

DESIGNED AND BUILT BY THOMAS

THIS is one of many such units, developed by Thomas for shearing aluminum and other vital present-day metals. It is typical of Thomas' ability to design and build equipment for metal-forming or fabricating requirements.

THOMAS
MACHINE MANUFACTURING COMPANY
PITTSBURGH, PA.

3

FABRICATING MACHINERY

Transportation Rulings

Railroads and Unions Agree On Shop Facilities Pool

Washington

• • • **Full use of** railway shop facilities, wherever available, to help urgent war material production, was unanimously agreed to by railroad management and railroad shop crafts at a meeting with representatives of the WPB, Department of Labor, and the Office of Defense Transportation. In agreeing to the WPB's request for use of the rail shops to aid vital war output, labor expressed the desire that first consideration be given to utilization of all available shop facilities for railway equipment manufacture, said Joseph E. Eastman, ODT director.

Products that rail shops may be asked to consider under this program would include items used in military and naval equipment, marine transportation, and in the manufacture of munitions and other war materials. Rail shops, now working on a 48-hr. week schedule, have been exempt from the provisions of the Walsh-Healey Act, and the shop crafts are in full accord with this exemption. A committee headed by Otto S. Beyer, ODT's director of transport personnel, and composed of two other members representing the Government, three from labor and three from railway management, will be set up to exercise general supervision of the plan to use railroad shop facilities for supplementary war production.

Use of the shops will probably be arranged through contractors and subcontractors. About 75 major shops and more than 400 back shops, employing upward of 150,000 men, will be affected by the agreement.

↓ ↓

Domestic Special Deliveries

• • • **To give industries** affected more time to revise delivery schedules and work out plans for tire and transportation equipment conservation, the effective date of a portion of the ODT order placing restrictions on local delivery services has been postponed from May 15 to June 1. The postponement applies to section 501.32 of general order ODT No. 6, providing for the elimination of special deliveries, call backs, and more than one delivery to the same person on the same day by any powered or horse-drawn rubber-tired vehicles.

↓ ↓

Great Lakes Carriers

• • • **A. T. Wood,** of Cleveland, has been appointed full-time Assistant on Great Lakes Carriers, under the Office of Defense Transportation. Formerly vice-president of the Wilson Transit Co., Mr. Wilson has been serving part-time in this new capacity since January, working with carriers and shippers to obtain maximum efficiency in aiding the war effort. The offices of the new assistant will be in the Terminal Tower, Cleveland.

House Division Closed

Milwaukee

• • • **The Harnischfeger Corp.** has closed its prefabricated houses division due to restricted materials and the need for additional operating space for crane production.

DEMPSEY
INDUSTRIAL FURNACES

There is a DEMPSEY FURNACE for every Heat Treating requirement...

Recirculating
Continuous Conveyor
Bright Annealing
Clean Hardening
Shell Forging
Shell Nosing
Shell Heat Treating
Cartridge Case Annealers
Billet Heaters
Coil Annealers
Normalizers

Charging end of continuous normalizing, annealing and heat-treating furnace

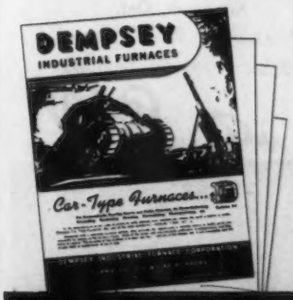
Will Pay for Itself in Less Than One Year!

The Dempsey furnace pictured above is a striking example of the superiority of Dempsey equipment where performance, economy, and production speed are important. Its controlled cooling cycle is outstandingly efficient in annealing operations. In addition to maintaining a more uniform temperature, thus producing higher-quality work, it . . .

- Saves Fuel
- Eliminates Labor
- Adds longer life to Tools
- Does the work of many smaller furnaces
- Reduces Costs

Our engineering staff will gladly survey your needs and suggest similar time-, labor-, and money-saving equipment.

New Bulletins give complete details. Write for them today.



DEMPSEY INDUSTRIAL FURNACE CORPORATION
SPRINGFIELD, MASSACHUSETTS
FURNACES—OIL & GAS BURNERS
Offers Combined 50 Years' Experience Building:
DEMPSEY FURNACES since 1917 • GILBERT & BARKER since 1908

New Machinery Price Schedule To Give Aid on Subcontracts

• • • **About 2000** machinery men from six states, seeking advice on price controls, particularly the new machinery price regulation, No. 136, attended an OPA meeting in Hotel Commodore, New York, May 13.

The acting chief of the OPA machinery branch, W. A. Neiswanger, brought out two important developments in connection with Schedule 136:

1. In an effort to encourage subcontracting, the new order will assist firms making new products under subcontracts. In these cases where prices had not been established last October, facts should be supplied OPA in letters asking exemption from the price schedule. A "freeze letter" will be received back from OPA by the firm. Ultimately a controlling regulation may be framed.

2. An amendment is "in the mill," according to Neiswanger, which will provide that deliveries against old contracts with the government may be made until June 15 at the prices agreed upon.

Neiswanger pointed out that the new schedule freezes prices of machinery, parts, subassemblies and machine work at Oct. 1, 1941, levels with certain exceptions, but does not cut across previously existing formal price schedules on machinery such as Schedules 1, 67, 105 and others.

Cost-plus-fixed-fee contracts are discouraged by the regulation, he said, but formal contracts specifying delivery nine months' in the future prices may be based on OPA ceilings at that time.

It was indicated by Neiswanger that indecision surrounds the subject of patterns and durable molds. They are not on the list of items specified in Schedule 136 but may be covered, he said. A ruling is awaited. If not covered, they will be covered, he added.

Where old materials no longer are available, manufacturers can base their prices on the higher or lower cost of substitutes, he said. The price schedule is flexible also as to quantity output, machining and assembly costs.

"What should a manufacturer do if he cannot operate at October levels?" asked Neiswanger. "If in these rare cases where you would actually be obliged to operate at a loss or if you cannot pay your out-of-pocket expenses on an item, let us hear about it and we will put the resources of our office at your disposal to see whether relief can be given promptly."

Among the questions and answers at the New York meeting were the following:

Q.—Does the maker of special machines have to submit separate cost calculations on each machine?

A.—No. We cannot review all these costs. Produce it and price it on the basis of October costs.

SHEARING BILLETS FOR VICTORY SHELLS
and keeping 'em moving twenty-four hours a day
Buffalo Billet Shears readily accept their assignment in the "Battle of Production"! These husky, powerful production tools are cutting Forging stock of every size and type—and on a non-stop 24 hour-a-day schedule. Fact is, Buffalo Billet Shears fit this kind of work to a "T", thanks to their electrically-welded frames of "Armor-Plate" steel and their extra-heavy construction throughout. They're easy to control, fast, economical to operate no matter how swift the production pace.
BUFFALO FORGE COMPANY
492 Broadway, Buffalo, N. Y.
Canadian Blower & Forge Co., Ltd.
Kitchener, Ont.
"Buffalo"
BILLET SHEARS

Price Schedule No. 136 Postponed to June 1

Washington

• • • The OPA has postponed until June 1 the effective date of maximum price regulation No. 136 on machines and parts. The regulation establishes Oct. 1, 1941, prices as maximum prices for all machines and parts not covered by other price schedules for all levels of distribution except retail. It establishes Oct. 1 rentals as maximum rentals for machines and parts it covers.

We may come around and check you up, however.

Q.—I am making vehicle parts for the Ordnance Department under a cost-plus-fixed-fee contract entered into in February, 1942. Am I covered by Price Schedule 136?

A.—That is a problem we have been discussing with the Army and Navy at great length and I cannot say yes or no to that question. If you make delivery before June 15 the old contract prevails. If the contract should result in a lower price than the maximum specified in the regulation, then the price is o.k. A third condition is that if your changeover to a new item occurred since Oct. 1, you are probably exempt under the subcontracting provisions of Price Schedule 136.

Q.—Does Schedule 136 apply to producers of finished and rough sleeve type cast bronze bearings?

A.—Yes.

Q.—Does Schedule 136 apply to fabricated structural steel?

A.—No.

Q.—In fixing the maximum price of a special and applying Oct. 1 labor levels, etc., does the seller take the true Oct. 1 value of the items or is it bound to take the interoffice Oct. 1 figures for those items on its sales and computing books where the periodic re-casting of those figures had not been completed by October?

A.—We do not attempt to establish the labor cost; we take the rate. Use October rates for the classifications of labor used. When labor time is reduced, reflect the saving.

Q.—When is a price is effect?

A.—The answer to this showed that an established price may be a quoted price, a published price, a price estimated on estimating sheets, and several other instances.

Q.—Do makers of mechanics hand tools come under this regulation 136?

A.—Hand tools like hammer or pliers come under the Consumer Durable Goods Section of OPA. Perishable tools like drills, and portable power driven tools come under Schedule 136.

Q.—We formerly purchased items in quantities at a quantity price. Under priority control we are now unable to obtain the same large quantities and are paying a higher price. How can this factor be controlled?

A.—If you are buying under the same discount schedule as of October, 1941, my offhand, tentative opinion is that you are conforming. Better write us a letter for a formal ruling after a review of the matter.

Q.—Will any form of certification be required on bills and invoices?

A.—Regulation 136 does not require it but the practice probably will be adopted by industries, for their own protection.

TCM

JESSOP HIGH SPEED STEEL

fully replaces 18-4-1

Jessop TCM High Speed Steel is the answer to restrictions on tungsten high speed steels. TCM is a low tungsten-molybdenum steel that cuts as well or *better* than 18-4-1.

There is no change in operating equipment necessary in using TCM High Speed Steel, because it is heat treated in the same furnace and the same atmosphere as 18-4-1 High Speed Steel. TCM Steel has a lower hardening temperature which contributes to a lower cost in heat treating.

Jessop TCM is lighter in weight than 18-4-1 which means more steel per dollar and more tools per pound of steel.

Jessop TCM conserves strategic alloys and meets demands for high speed steels required in the war production effort. Write for new literature.

There is a Jessop steel for every tool and die requirement.

JESSOP STEEL COMPANY

General Offices

Washington, Penna., U. S. A.

JESSOP STEEL CO. FINE JESSOP STEELS WASHINGTON PA.

JESSOP

JESSOP STEELS FOR AMERICA AND HER ALLIES

CARBON • HIGH SPEED • SPECIAL ALLOY • STAINLESS • COMPOSITE STEELS

Q.—If an established price is shaded for one customer because of competition, must that lower price be maintained for that customer?

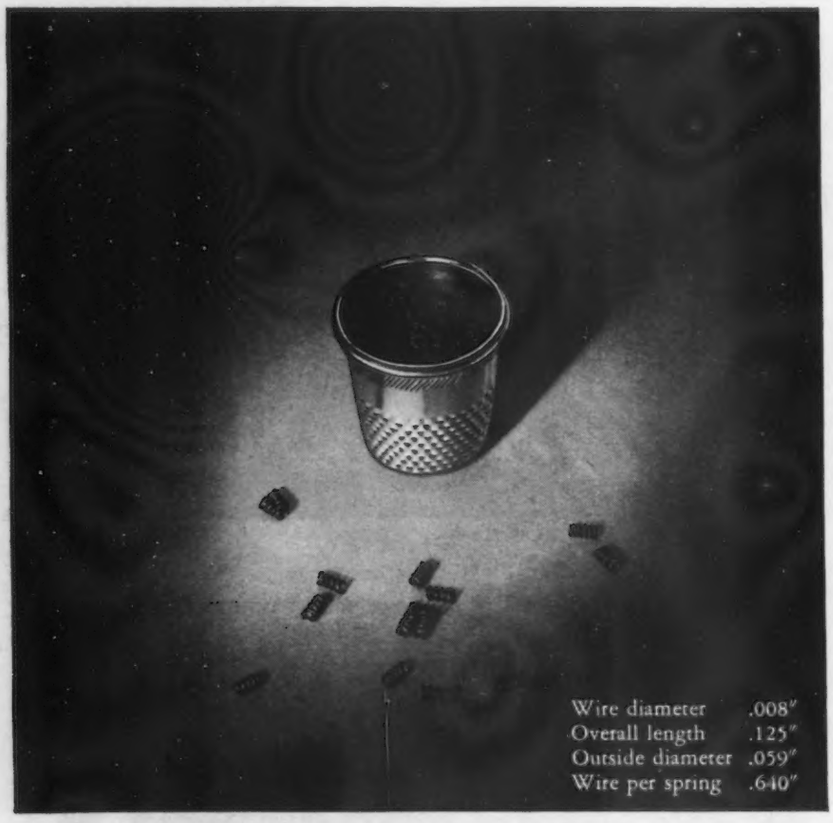
A.—It is difficult to give a definite answer. If a unique transaction, the price probably will not have to be continued. If this individual customer's price arose out of circumstances which permit his classification as a special class of purchaser, then it is required to continue them.

Q.—Is the freeze letter issued around April 22 now completely replaced by No. 136 and other schedules?

A.—Yes.

Q.—The differential between machine tools, domestic and export, list prices frozen at the differential existing March 1, April 15, 1942, or June 1, Dec. 1, 1940, whichever is lower. Should not the 1940 period have been the 1941?

A.—I can only answer that question by referring to the Federal Register of April 28, 1942, which under 1375.2 adds to cost or domestic prices an amount not in excess of the average premium charged in the export trade for the particular services or functions performed during either the period July 1-Dec. 31, 1940, or March 1-April 15, 1942, whichever average premium is lower.



SO TINY—Half a thousand springs make but a thimbleful, yet so accurate there is seldom half a thousandth variation in their diameters. Another spring-makers' problem solved by Torrington's W-100 Spring Coiler which is specially built to accurately coil small wire .003" to .015". One minute's production nearly filled the thimble used in the illustration—convincing proof of speed double that hitherto possible with springs of this size.

For complete information on the W-100 and twelve other Coilers, write

THE TORRINGTON
MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT

Aluminum Co. Agrees to Reduce Fabricated Prices

• • • **Aluminum Co.** of America at the request of Price Administrator Henderson has agreed, beginning June 15, to make substantial reductions in the prices of fabricated aluminum products. Substantial savings will be afforded the government in its purchases of planes and other essential war materials, according to OPA.

In some quarters the action was viewed as holding considerable significance for other parts of the metals industries, the theory being that the move might foreshadow attempts to force down prices in other materials where the government is the principal buyer. As previously stated, all government contracts are being surveyed toward effecting savings for the government. In the steel industry particular attention is being paid steel extras, their application and their reason for application.

"OPA has been studying the prices of fabricated aluminum products for some time," Mr. Henderson stated. "The production of these products, principally aircraft sheet, castings and forgings, has tremendously increased and will continue to increase to meet the expanding plane program.

The reduction in prices will range from more than 20c. per lb. on some of the high cost fabrications down to one cent per lb. in cases where margins are small, OPA said. Reductions will be made in the prices of 24S sheet and plate and forgings going into airplane production. These reductions will apply to all deliveries made on and after June 15, 1942, even if made pursuant to contracts entered into at higher prices prior to June 15, it was announced.

Heating and Cooking Stoves

• • • **Civilian production** of a limited number of simplified and

light weight domestic cooking appliances by smaller companies will be permitted by order L-23-c, effective May 15. The WPB for the first time adopted the principle of "concentration of production" and ordered an end to the manufacture of these appliances by large producers after July 31, turning the work over to small producers. It was estimated that the order will conserve about 350,000 tons of iron and steel annually.

The order designates 39 "labor shortage areas" in 15 states. Any firm, large or small, located in these areas must discontinue production of cooking and heating stoves after July 31.

Steel Advisory Committees

• • • **Price Administrator Henderson** has invited 36 steel men to become members of four advisory committees to serve as liaison groups between the OPA and the industry on any problems which may arise with respect to prices.

The four advisory units, created under the terms of the Emergency Price Control Act of 1942, are to be known as: General Steel Products Advisory Committee; Armament Steels and Alloys Advisory Committee; Wire Products Advisory Committee; Cold Finished Bars Advisory Committee.

The Price Control Act stipulates that in the case of any commodity for which a maximum price has been established, the Administrator shall, at the request of any substantial portion of the industry involved, appoint an industry advisory committee. Such requests had been received from a substantial portion of the iron and steel industry.

The four groups will be purely advisory. They will weigh any problems arising in connection with Revised Price Schedule No. 6, on iron and steel products, or allied or future orders affecting the steel industry.

Invited to serve on the committees are:

General Steel Products Advisory Committee: Avery C. Adams, United States Steel Corp.; J. W. Anderson, Sheffield Steel Corp.; Homer Butts, Niles Rolling Mill Co.; Norris J. Clarke, Republic Steel Corp.; J. A. Henry, Weirton Steel Co.; Paul Mackall, Bethlehem Steel Co.; J. L. Neudoerfer, Wheeling Steel Corp.; N. H. Orr, Colorado Fuel & Iron Corp.; L. M. Parsons, Jones & Laughlin Steel Corp.; A. C. Roeth, Inland Steel Co.; W. E. Watson, Youngstown Sheet & Tube Co.

Armament Steels and Alloys Advisory Committee: R. M. Allan, Allegheny Ludlum Steel Corp.; W. H. Colvin, Jr., Rotary Electric Steel Co.; Norman L. Deuble, Copperweld Steel Corp.; Horace D. Disston, Henry Disston & Sons, Inc.; A. T. Galbraith, Crucible Steel Co. of America; F. L. Gibbons, Carnegie-Illinois Steel Co.; J. H. Parker, Carpenter Steel Co.; Martin H. Schmid, Republic Steel Corp.; Rufus Tucker, Bethlehem Steel Corp.; H. H. Ziesing, Midvale Co.

Wire Products Advisory Committee: H. J. Blaser, Seneca Wire & Mfg. Co.; John Graham, American Steel & Wire Co.; N. L. Hite, Continental Steel Corp.; Ernest C. Low, John A. Roebling's Sons Co.; Henry Roemer, Jr., Pittsburgh Steel Co.; Ford Schusler, Keystone Steel & Wire Co.; C. F. Stone, Atlantic Steel Co.; E. C. Stout, Wickwire Spencer Steel Co.; G. F. Wright, G. F. Wright Steel & Wire Co.

Cold Finished Bars Advisory Committee: W. R. Howell, Bliss & Laughlin, Inc.; V. A. Jevon, Jones & Laughlin Steel Corp.; W. N. Lynch, Keystone Drawn Steel Co.; E. L. Parker, Columbia Steel & Shafting Co.; J. T. Somers, Wyckoff Drawn Steel Co.; F. C. Young, Republic Steel Corp.

South American Shipments

• • • **To the extent** necessary to meet delivery schedules set by the

Full Speed Grinding under Full Load

STANLEY

No. 566 Portable Grinder

The powerful Universal motor drives this Stanley Portable Grinder at 2600 r.p.m. under full load on tough work. This heavy-duty tool is just right for preparation work before welding, and cleaning up afterward. It's well balanced for easy handling, without "bucking", built to stand up.

Write for literature. Stanley Electric Tool Division, The Stanley Works, 173 Elm St., New Britain, Connecticut.

TRADE STANLEY MARK

Doing Our Best!

The widespread demand for Stanley Electric Tools in war production work means that we may not be able to supply you as soon as we would like to.

We have more than doubled our production of a year ago. We're doing our best . . . but priority business must be taken care of first.

STANLEY ELECTRIC TOOLS

A Complete Line for Industry

Board of Economic Warfare and WPB, exports of critical materials to the other American republics, will be given preference over other orders for such materials. The general export order M-148 provides that when an order for any material listed in an accompanying schedule is served on a producer, together with a BEW export license, the order must be filled on the delivery date specified in the license. Fulfillment is required of any other orders bearing high preference ratings on the producer's books or delivery schedules.

Products in the schedule include pig iron, semi-finished and finished steel products, castings, forgings, cobalt, copper, brass and bronze, lead, pig tin, ferromanganese, ferromolybdenum, molybdenum wire, ferrotungsten, tungsten, and ferrovanadium.

PRESSED COLD by PARISH In 4000 ton Press

The method best suited for each particular stamping—to insure most effective results, most efficient production and most modest cost—is employed when you present your problems to the Parish plant.

Equipped to handle all types of work in all methods and sizes of stamping, our plant is able to meet your specifications in all its elements, including the factor of time.

Illustrated is a Spring Plank for railroad freight car trucks. Made of 7/16" metal—16⅝" wide at ends, 14¼" wide at center and 93¼" long with flanges 3⅜" high at center, 2 3/16" high at ends—it was pressed cold from heavy steel.

The submission of your requirements for review involves you in no obligation.

PARISH
PRESSED STEEL CO.
READING, PENNA.

Pacific Coast Representative
F. Somers Peterson Co.,
57 California St.,
San Francisco, California

We have turned our facilities over entirely to the manufacture of various products required by the United States Government and American Railroads.

Higher Bar Prices Denied

Washington

• • • **OPA** announced it had denied a request of the Pollak Steel Co., which operates a mill at Marion, Ohio, to charge a base price of 2.40c., on merchant bars. The OPA base price is 2.15c. The company withdrew previous request to increase maximum prices on reinforcing bars and to quote merchant bars f.o.b. Cleveland. In denying the company's request on prices of merchant bars, the OPA said, after an examination of Pollak Steel's profits and production costs:

"An exception will not be granted merely to make a particular item more profitable when overall profits are good. In the present case, the petitioning company makes a slight profit on sales of merchant bars at ceiling prices. The 1941 overall profit figures are good. Adjustment of February figures to allow for sales at established maximum prices, and for a decline in warehouse revenues which is far from certain, leaves the petitioner with a profit margin of 7.74 per cent of net worth."

General Regulation on Prices Now in Effect

• • • **In all fields** in which no formal price ceilings were established (including several in the metals fields), the General Maximum Price Regulation which became effective last Monday, prohibits retail prices higher than the highest charged in March.

Ceilings established by the General Regulation will control retail selling prices in case of any conflict with state Fair Trade Laws.

Brass Price Cut

• • • **Brass ingot** price reductions ranging from ½c. to ¾c. a lb have been announced by Federated Metals Division of American Smelting & Refining Co., ef-

Murray Asks SWOC Be Built on Love

Cleveland

• • • Facing an enthusiastic audience of some 1600 delegates assembled at the Public Hall here at the third international convention of the Steel Workers Organizing Committee, Philip Murray, chairman of SWOC and president of the CIO, declared, "We haven't even got started yet. There is a lot of work to be done—the perfection of this organization, the improvement of the services and functions of the union, the perfection of better labor contracts, further improvements to be won for steel workers, and further extension of our activity to bring into our fold those who are not yet members. This will be the most important labor convention that will be held this year, important because an important organization is having its first constitutional convention at a time of war."

He asked that the organization "be built on the basis of love for the union, rather than love for the man."

fective immediately. The lower prices, applying primarily to the 88-10-2 alloys and the manganese bronzes, were effected as a result of reductions in copper scrap prices. The changes were made on the company's own initiative, not by government order.

Trade Notes

The offices of the Pittsburgh Crucible Steel Co. have been merged with the offices of the Crucible Steel Co. of America in Cleveland and Detroit. Frank E. Phelps will continue to manage the Cleveland office, 1258 East 55th Street, and William G. Hassel, former manager of the local Pittsburgh Crucible Co. office, will manage the Detroit office, 3245 Hubbard Avenue. C. J. Ryan has been appointed assistant manager of the Detroit office.

•

Wheelco Instruments Co., Chicago, has appointed the following district representatives: Iowa and Nebraska, Pasol Engineering Co., with V. E. Lindquist in charge of the Iowa office at Des Moines, and I. I. Solzman the Nebraska office in Omaha; Kansas, Fitzgerald, Inc., Wichita, with Bloyce Fitzgerald in charge of instrument sales; Texas, Charles A. Drum, Houston.

•

Metal & Thermit Corp., New York, has appointed Harold P. Blum, 1615 Collamer Avenue, Cleveland, its Cleveland territory representative for Murex arc welding electrodes. Mr. Blum will continue to represent Una Welding, Inc., on automatic welding equipment.

Scrap Registration Forms Being Printed

Washington

• • • OPA announced on Tuesday that forms for registration of all dealers, including sales of iron and steel scrap to consumers or their brokers selling waste, scrap and salvage material to consumers are now being printed. The licensing regulation, supplementary order No. 5, which automatically licenses such dealers and requires them to register with OPA on or before June 20 becomes effective May 20. The forms will be mailed to dealers by the end of this week. They also will be available at all OPA offices by the middle of next week. Thus, any dealers who do not receive forms in the mail may obtain them in ample time to register before June 20.

FLATNESS
AND
SMOOTHNESS
of Production Parts
YOUR production parts finished by the new Ultra-Lap machine method, to an optically flat surface . . . to specifications for flatness of one light band or less . . . to a smoothness as low as one micro-inch R.M.S. . . . any metal or material, or any combination thereof . . . much faster, more uniform than hand methods.
Machine designed for you or we shall be pleased to lap your parts on a job basis. Ultra-Lap machines and service used by aircraft and many other war-time industries.
Ultra-Lap MACHINE COMPANY
255 McDOUGALL AVE. DETROIT, MICH.

PD-25-a Simplified and PD-25-x Use Discontinued in 3rd Period

• • • **A revised form** of application for priority assistance under the Production Requirements Plan, P-90, will be used during the third quarter, 1942, but form PD-25-a will continue in use with alterations made directly on the form. New instructions to applicants will allow them to omit a considerable part of the information previously required, and users of materials will be able to supply the same reports on PRP applications that they are now preparing in answer to the general metals questionnaire on forms PD-275, thus avoiding duplication of paper work.

Most of the limited blanket ratings under which preference ratings have been assigned on an industry-wide basis will be revoked or allowed to expire, and companies that have been using these blanket ratings will be required to apply under PRP.

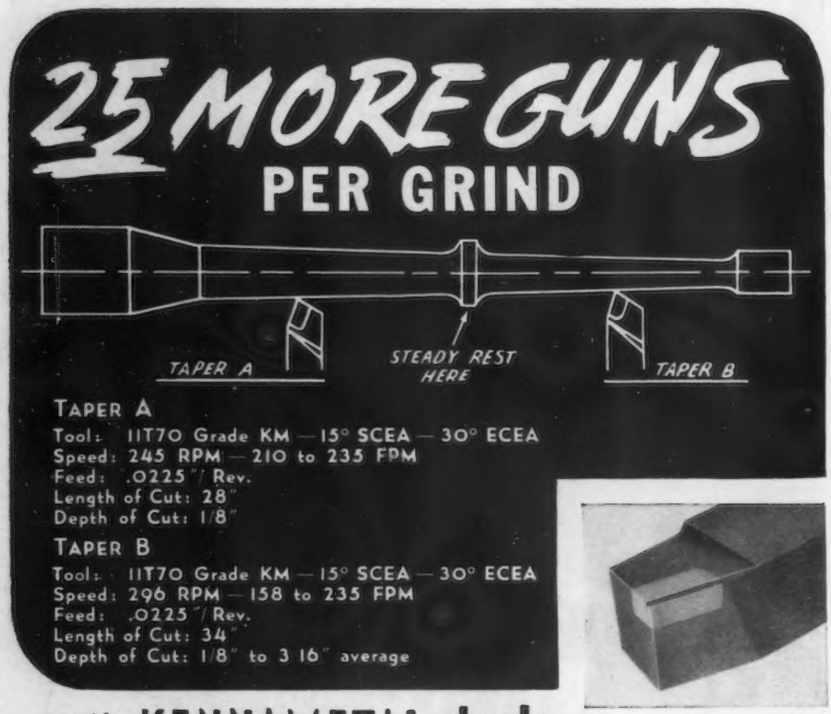
Emphasis on the use of the product rather than on the pattern of existing preference ratings on orders to be filled by the applicant will make it possible to eliminate much of the information previously required from PRP applications, and will constitute a basis for new, simplified instructions.

Processing directions for rating assignments will replace many of the orders in the "P" series. The ratings assigned to applicants may be applied only to a specified quantity of materials or products to be delivered in a calendar quarter. In some cases, applicants may be given a higher rating for limited quantities of a specific kind of material that they would be entitled to use for all of their requirements under a "P" order.

Because of this simplification of applications, use of the special form PD-25-x by firms with an annual business of less than $100,000 a year will be discontinued after May 23. This form was originally designed to reduce paper work required from small manufacturers, and with the new and simplified PD-25-a a great deal of such work is eliminated. Further simplification of PD-25-a is being studied and may be put into effect for subsequent quarters.

PRP applications from new applicants for whom a processing direction has not yet been issued will be handled in much the same way as individual applications on PD-1-a forms by concurrence in the ratings and the amounts of materials for which ratings are assigned between the Production Requirements Branch and the industry and materials branches concerned.

The old form PD-25-a shall be used during the third quarter but


25 MORE GUNS
PER GRIND
TAPER A
STEADY REST HERE
TAPER B
TAPER A
Tool: 11T70 Grade KM — 15° SCEA — 30° ECEA
Speed: 245 RPM — 210 to 235 FPM
Feed: .0225 "/ Rev.
Length of Cut: 28"
Depth of Cut: 1/8"
TAPER B
Tool: 11T70 Grade KM — 15° SCEA — 30° ECEA
Speed: 296 RPM — 158 to 235 FPM
Feed: .0225 "/ Rev.
Length of Cut: 34"
Depth of Cut: 1/8" to 3 16" average

Style No. 11

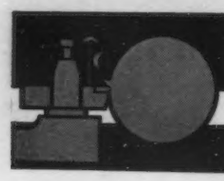
with **KENNAMETAL tools**

● In finish machining heat treated alloy steel gun barrels, KENNAMETAL Style 11 tools completed an average of 40 pieces per grind, as compared to an average of 15 pieces per grind completed by competitive carbide tools. That fact means KENNAMETAL saved hours of "down time" for the manufacturer, helped him to produce *more* guns *more* quickly.

The superior strength and hardness of KENNAMETAL permit greater machining speeds and removal of more metal between grinds than other carbides. If you machine steels in hardnesses up to 550 Brinell, KENNAMETAL tools can turn "down time" into production time for you.

KENNAMETAL
The Accepted
STEEL CUTTING
CARBIDE

Write for the KENNAMETAL Vest Pocket Manual



McKENNA METALS Co.

144 LLOYD AVE., LATROBE, PENNA.

Foreign Sales: U. S. STEEL EXPORT CO., 30 Church St., New York
(Exclusive of Canada and Great Britain)

PD-25-a Still To Be Used

• • • While revisions, as outlined in the Priorities Section article on the Production Requirements Plan, will be made and many columns now on the form disregarded, the actual form as used in the April-June quarter will remain in use for the third quarter. The changes directed by WPB will be made on the form by the applicant. A list of these changes and corrections appear in the article.

headings will be changed so that it conforms to the requirements for the July-September reports, and only those columns need be filled out which are listed in the new instructions. By this revised procedure, processing of applications in the branches of WPB will be simpler and faster.

Specific changes in the use of form PD-25-a, as outlined in the new instructions, are as follows:

SECTION B: Reports of shipments in the most recent three months for which figures are available **no longer need be broken down by preference ratings;** only **total** shipments must be reported. It is no longer required that **columns 6, 7, 8, and 9** be filled in.

SECTION C: Inventory reports covering classes of products included in Section B **are eliminated entirely.**

SECTION D: Change **"Unfilled Orders"** column to **"Orders Scheduled for Shipment During Quarter."**

SECTION E: Disregard **columns 4 and 5,** covering **"Inventory Beginning of Quarter"** and **"Received During Quarter."** Under **"Statement for Quarter Ending ——",** fill in only **columns 6 and 7,** in which should be reported: **"Past Use"** and **"Inventory at End of Quarter."** Headings of columns 8, 9, 10, and 11 should be changed from **"Quarter Ending June 30, 1942"** to **"Quarter Ending September 30, 1942,"** or the closing date of any calendar quarter for which application is submitted.

SECTION D: The column headed **"Unfilled Orders"** must be changed to **"Orders Scheduled for Shipment During Quarter."**

SECTION E: Disregard **columns 4 and 5,** covering **"Inventory Beginning of Quarter"** and **"Received During Quarter."** Under **"Statement for Quarter Ending ——** (most recent 3 months for which figures are available)" fill in only **columns 6 and 7,** in which report past use, and inventory at the end of the quarter. The heading of **columns 8, 9, 10, and 11,** covering anticipated requirements, should be changed from **"Quarter Ending June 30, 1942"** to **"Quarter Ending September 30, 1942,"** or the closing date of any calendar quarter for which the application is submitted. The heading of **column 10** under Section E now **"Leave Blank"** should be changed to: **"To Be Received During Quarter."** In this column report requirements of new materials to be received from suppliers during the quarter; the difference between column 8 and column 10 representing the amount of materials which can be taken from inventory.

A new and simpler classification list for metals, showing the form in which they are to be reported in Section E, accompanies the new instruction sheet. This classification list conforms with the list used on the general metals questionnaire: form PD-275, and is to be substituted for the classification of metals now contained in Materials List No. 1 of form PD-25-a. Other materials are to be reported in Section E in accordance with Materials List No. 1, as before.

SECTION F: Report inventories and requirements of materials not contained in Materials List No. 1 or in the metals classification, exactly the same as the changes in Section E—**columns 4 and 5 will be disregarded,** and in **column 10** report the **dollar value of receipts of such materials** which needed to fill requirements during the quarter.

SECTION G: Applicants may now also include requirements for minor capital items. However, such capital items must be **directly** concerned with plant operations, must **not** include office machinery or any machinery for addition to or expansion of existing facilities, and must **not** include machine tools or large equipment items.

SECTION E AND F SUPPLEMENT: Here, anticipated requirements broken down by classes of products produced, **must be filled in by all applicants.** However, this section now becomes in fact a supplement to Section E only; the report should include **only anticipated requirements** of materials listed in Materials List No. 1 or in the metals classification list, and must **not** include other materials reported in Section F. Consequently, the totals of the quantities entered in the anticipated requirements columns—columns 12, 14, 16 and additional columns if necessary—must equal the requirements of each material reported in column 8 of Section E.

Elimination of the figures previously required on Form PD-25-a in the columns which have now been cancelled will mean that applications will be rated in the WPB to an increasing extent on the basis of the importance of the applicant's products or the "end use" of his products, and less con-

Made to order
• FOR YOUR PRODUCT
SPRINGS
Compression, extension, torsion and flat types, with various kinds of ends and loops—made in steel, brass, bronze and other alloys—formed, heat treated and tested for specific functions and applications.
STAMPINGS
Small stampings of any shape or form made to users' specifications or developed to fit certain conditions—made from various metals and alloys; also heat treating, spot welding and tapped assemblies.
WIRE FORMS
Pins, clips, cotters and other various, intricate shapes in rounds, flats and squares including heat treating and welded assemblies for every kind of mechanical application; and from all types of metals.
M-D-HUBBARD SPRING CO.
331 CENTRAL AVE. • PONTIAC, MICH.

CONTINENTAL STEEL

CONTINENTAL STEEL CORPORATION
SUPERIOR STEEL SHEETS

CONTINENTAL STEEL CORPORATION
SUPERIOR STEEL WIRE

These are trademarks well-known among manufacturers for the quality they represent. Continental produces steel sheets and wire in a vast variety of specifications to meet the requirements of manufacturers.

CONTINENTAL STEEL CORP.
Kokomo, Indiana
(The Superior Sheet Steel Co., Canton, Ohio — a subsidiary.)

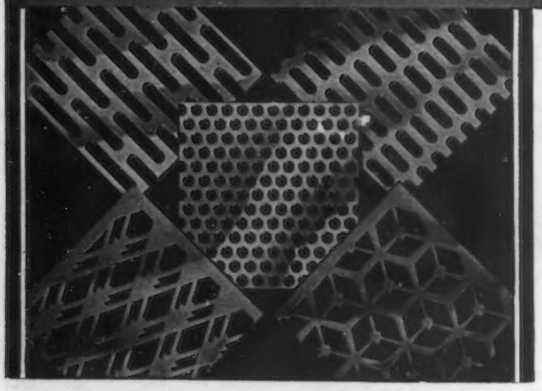
CONTINENTAL SUPERIOR STEEL

CONTINENTAL
STEEL CORPORATION

SHEETS: Black, Galvanized, Copperior, Hot and Cold Rolled, Special Coated, Long Terne, etc.

WIRE: Bright Basic, KONIK, Coppered, Tinned, Specials, etc., also CHAIN LINK FENCE

PERFORATED METALS



• INDUSTRIAL AND ORNAMENTAL •

ANY METAL

ANY PERFORATION

• Making holes is our entire business and we've made billions and billions of them—little ones, big ones, round, square, oblong and slot holes besides shapely ones in many beautiful designs. Our service is at your command.

The Harrington & King PERFORATING Co.

5657 FILLMORE ST., CHICAGO

114 LIBERTY ST., NEW YORK

sideration will be given to the existing pattern of preference ratings on his orders.

This constitutes a further step toward use of the Production Requirements Plan as a method of allocating specific quantities of materials to producers on the basis of the importance of their operations in war and essential civilian production.

↓ ↓

Machine Tools

• • • **The term** "purchase order," according to an interpretation of order E-1-b on machine tools, means a firm order for a machine tool which is accompanied either by specifications or by other description of the tool in sufficient detail to enable the producer to place the tool in his production schedules. Some prospective purchasers of machine tools have advised tool builders of their intention to purchase machines of a given type, but the tool is frequently described in such vague terms that it cannot be placed in a production schedule according to the provision of E-1-b, until additional information is furnished. Descriptive advices should not be treated as purchase orders, according to the interpretation.

↓ ↓

Mine Ratings

• • • **Special reference** to gold and silver mines has been eliminated from order P-56, which denied high ratings to mines producing more than 30 per cent in value of gold or silver, by a WPB amendment to the order. The order now provides that the high preference ratings which it grants are available only to mine operators who have been assigned serial numbers by the WPB. As each case is thus subject to review, the amount of critical war materials produced by a mine will continue to be the guiding factor in granting preference ratings.

↓ ↓

Freight Car Builders

• • • **Freight car producers** may accept deliveries of parts and ma-

terials from suppliers if such parts are not subject to other rated orders despite the fact that all ratings of A-2 or lower assigned to car producers were recently cancelled. Amendment No. 1 to order L-97-a-1 clarifies the order issued April 29, which prohibited producers from accepting delivery of car construction material on orders rated A-2 or lower which was not in transit to the builders on that date. Under the new amendment, suppliers may dispose of inventories of processed or partly fabricated parts if deliveries can be made to producers as on unrated orders.

Suppliers' Inventories

• • • **Eleven categories** of merchandise have been exempted from the restrictions imposed by suppliers' inventory limitation order L-63. Interpretation No. 1 of the order lists seeds, plants, livestock, fertilizer, clocks, watches, sporting goods, furniture, pottery, china, and glassware as items which need not be included in calculation of the dollar volume of inventories permitted by L-63. Inventories of these items remain subject to the terms of priorities regulation No. 1, which provides that such inventories must be kept to a practicable working minimum. By the removal of these items, dealers needing priority assistance in obtaining them must apply on form PD-1-a instead of PD-1-x, which is to be used for goods placed under inventory control by L-63.

Metal Furniture

• • • **Metal household** furniture manufacturers were given permission by WPB to use the iron and steel in their inventories prior to March 20, provided the material was so far processed as not to be usable for any other purpose, but the acquisition or processing of additional materials is forbidden according to amendment No. 2 to L-62. The amendment also advances the production shut-off date from May 31 to June 30 to permit additional assembly of processed parts. It permits production of venetian blinds containing less than 15 oz. of metal per unit. The definition of "manufacturer" is amended to include manufacturers of parts specifically intended for incorporation into metal household furniture. Manufacturers are allowed to buy from other manufacturers and use zinc, or zinc die castings containing less than 2 per cent aluminum which had been made into venetian blind parts prior to March 20.

Electroplating Equipment

• • • **Effective immediately** WPB has issued General Limitation Order L-110 restricting the manufacture, delivery and sale of electroplating and anodizing equipment to orders rated A-1-J or higher. Such ratings must be assigned on PD-1-A forms and must be dated after the effective date of the order.

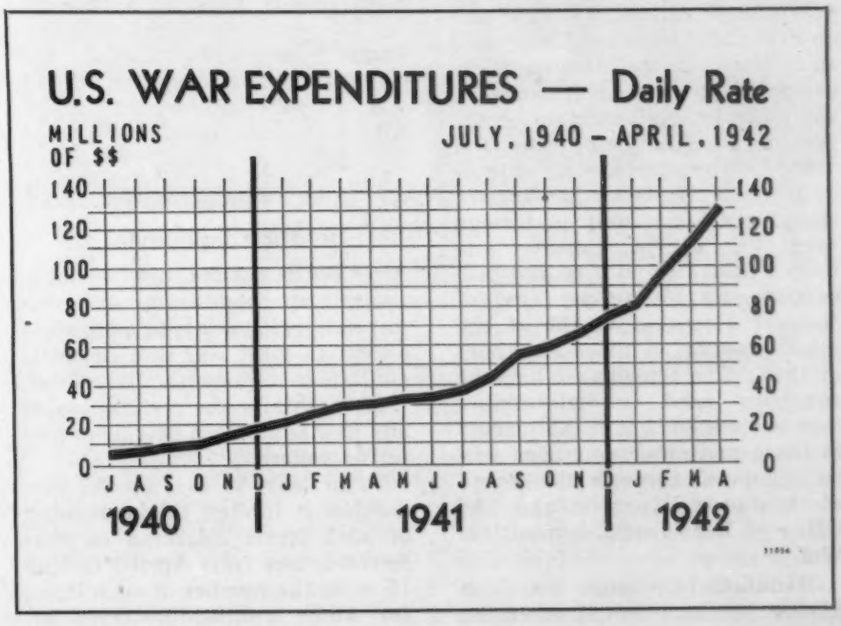
Electroplating or anodizing equipment which was ordered from a manufacturer or a distributer prior to the order, and which was more than 50 per cent completed on a man-hour basis, may be completed and shipped, provided this is done in the next 15 days. In issuing ratings, WPB will consider the number and capacity of such facilities available in a particular locality; the anticipated need for such equipment in that locality; the number of uncompleted orders placed prior to the issuance of the order and the amount of work done.

Farm Machine Raw Materials

• • • **Control over the** disposition of surplus inventories of iron and steel held by manufacturers of farm machinery and equipment was taken over by WPB. At the same time the board removed farm equipment from the list of "critical materials" subject to the terms of General Export Order M-148, which gave preferential treatment to purchase orders when accompanied by a license for export to Latin America. Under the terms of supplementary limitation order L-26-b, manufacturers, except under certain conditions, cannot dispose of inventories of iron or steel in raw or partially fabricated condition which are in excess of requirements under limitation order L-26 establishing production quotas for most types of farm equipment.

Surplus inventories may be dis-

AVERAGE DAILY WAR SPENDING: The average daily rate of war expenditures by the United States increased in April to $131,600,000, compared with $114,900,000 in March, according to WPB. Total expenditures for the month were $3,421,000,000 against $2,987,000,000 in March. In July, 1940, the daily rate was only about $7.7 millions.



posed of as follows: On orders for alloy steel bearing a preference rating of A-1-k or higher; on other orders assigned a rating of A-3 or higher; to the Defense Supplies Corp. or Metals Reserve Co., or any other RFC corporation; to any iron or steel mill for reprocessing or resale within the limitation of various WPB orders; and upon specific authorization of the WPB after application has been filed on Form PD-479.

Manufacturers disposing of alloy steel on an A-1-k or higher rating or any other steel and iron on an A-3 or higher rating must obtain from the prospective purchaser a letter certifying the material and quantity ordered and the preference rating applied, and forward duplicates to the Distressed Stock Unit of WPB's Iron and Steel Branch at the time shipment is made.

An amendment to the farm machinery limitation order, L-26, has been prepared making it unnecessary to include farm equipment under the terms of M-148. Amendment No. 1 to M-148 therefore removes farm equipment from the materials and products listed in Schedule A of the order, and also removes the United States Export Code Classification numbers referring to farm equipment from Schedule B.

Farm Machinery Exports

• • • **Modifications of** restrictions on exports of farm machinery and equipment allow manufacturers greater discretion in determining the types of equipment to be exported. Some of the provisions of order L-26 are replaced by amendment No. 3 which authorizes manufacturers to ship to foreign countries, except Canada and United States territories and possessions, up to 112 per cent of the net shipping weight of the total quantity to those countries in 1940. The amendment lists the countries used in determining this percentage quota. Shipments to these and other countries will be regulated through the Board of Economic Warfare and the Office of Lend-Lease Administration.

Manufacturers must file form PD-388 by the 10th day after the effective date of the amendment which is May 18, reporting shipments during 1940 and 1941 to each of the countries listed and to Canada, as well as shipments during November and December, 1941 and the first four months of the current year to each foreign country, listed or not. Beginning June 10 and by the 10th of each month thereafter, manufacturers must report on form PD-387, shipments made during the preceding month to each foreign country.

Priorities Under the Maharajah of Swat

(*Turn back to Page* 37)

"So they journeyed far and wide and returned with all manner of eggs, large and small, that could be found in the kingdom. These they proceeded to strew in the paths of elephants after passing a law that any laboring elephant who stepped on an egg (violated a priority regulation) should be smitten in the rear with a sharp spear."

For reprints of the full text of this editorial, "History Repeats," write to THE IRON AGE, 100 East 42nd Street, New York.

Plumbing Supplies

• • • **Restrictions on the** manufacture of necessary items for use in Navy and Maritime Commission vessels have been removed by amendments to schedules covering plumbing fittings and valves. The amendments are No. 1 to Schedule I and No. 2 to Schedule II of order L-42.

Refrigeration Equipment

• • • **WPB banned new** installations of air conditioning and commercial refrigeration equipment except to meet war and essential civilian requirements. The order, L-38, prohibits the installation of any new equipment except on preferred orders.

From May 15 to June 30 production is limited to the number of such items delivered on preferred orders from April 1 to May 15, or to the number of such items for which unfilled preferred orders are now on hand, whichever is the greater of the two quantities.

For the next 90 days, only the Army, Navy and Maritime Commission will be entitled to contract for production of such items. After that time production must be stopped completely.

PD-73 Used With Orders for Shipment Before June 1

• • • **WPB form PD-73** must still accompany orders calling for shipment prior to June 1. This, it is pointed out, applies only to iron and steel shipments from producers, according to the terms of amendment No. 4 and extension No. 2 to steel priority order M-21.

All orders or unshipped portions of orders, except groups such as Lend-Lease, general export and warehouse, on steel company books at the close of business on May 31, must be grouped according to the new classifications given in schedule A of the order, as amended, and must carry certification in accordance with section C (2) of amendment No. 4. Such purchase orders must be for material of a single group classification.

All orders now on steel mill books, except those grouped as: "C" for Lend-Lease, "E" for other export, and "F" for warehouse, must be reclassified by customers.

Tin Plate Freeze

• • • **Use of tin** and terne plate, except by special authorization, was limited to a few specific items by WPB in a revision of supplementary order, M-21-e. The permitted uses are for cans as authorized in M-81; closures as authorized by M-104; baking pans for institutions and commercial bakers; dairy equipment; cheese vats; gas meters; oil lanterns; and textile spinning cylinders and card screens. Limits of the amount of tin on the plate use for these items are listed. All other uses of tin or terne plate except for Army, Navy, and Maritime Commission contracts, are stopped, and all inventories of such plate frozen by the order must be filed with the WPB so the material can be purchased and channeled into war production.

Cut in War Expansion May Cost Millions

Washington

• • • **The size of the pie WPB** is getting ready to cut in war expansion amounted to $10,000,000,000 worth of federally financed war construction at the end of March. Approximately 2000 armament producing plants figured in the overall cost which had been authorized at that time.

After Pearl Harbor expansion programs were drawn by WPB planners who did not take into consideration the production which might be had by conversion. Plants as much as 10 per cent complete may be stopped and though contractors will be reimbursed for engineering plans and construction now complete, the waste, it is said, will amount to many millions of dollars.

New Plan Made to Speed Structural Shapes

Washington

• • • **Plans to increase materially** the output of structural steel shapes used in shipbuilding were announced on Monday by the Iron and Steel Branch of WPB. Curtailment of other items made on the same mill equipment will make the increase possible.

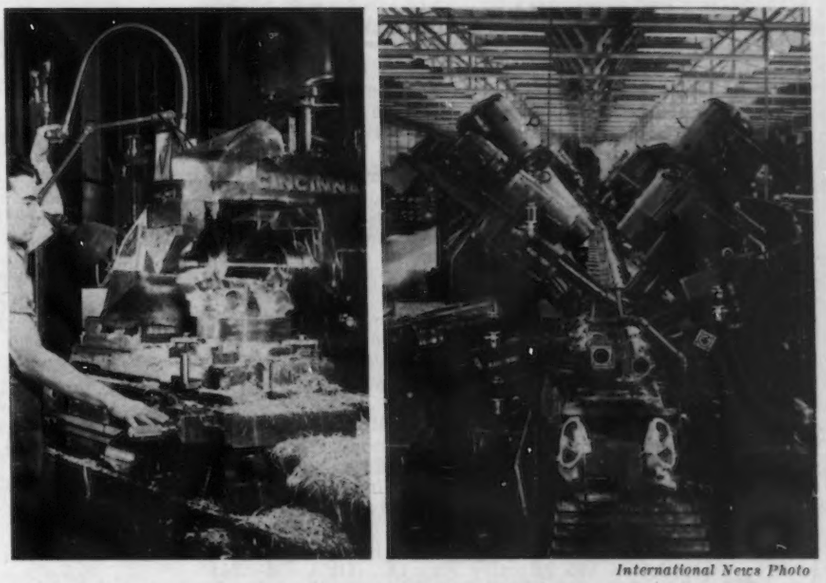
Production of structural shapes has not kept pace in recent months with the expanded output of steel plates made possible by the conversion of strip mills to plate production, it was stated. Therefore, it is necessary to expand shape production in June.

A directive to steel companies to carry out the program has been issued by J. S. Knowlson, Director of Industry Operations.

Cleveland Firms Get Both "A" and "E" Awards

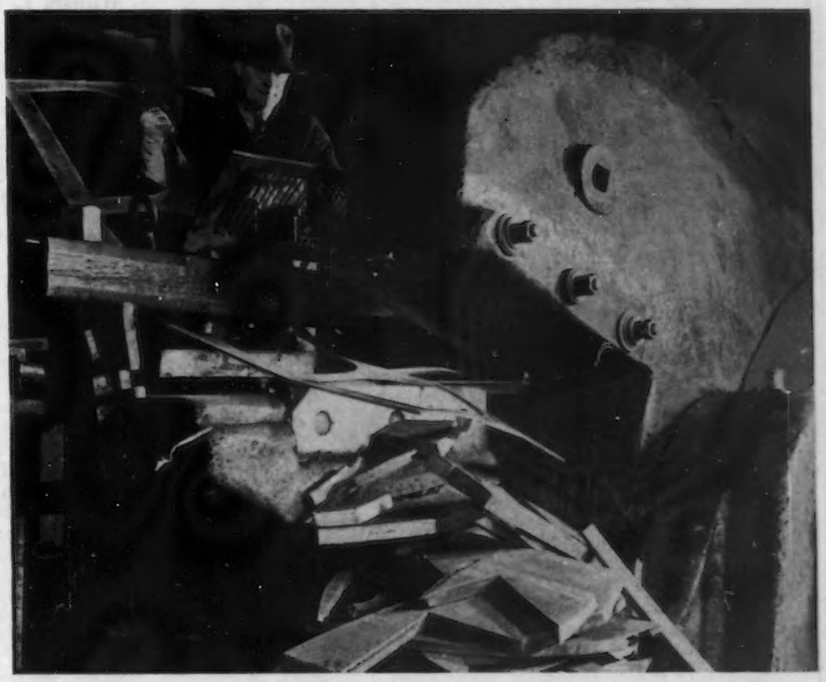
Cleveland

• • • **Two Cleveland concerns,** National Acme Co., and Cleveland Twist Drill Co., will be the first in the country to be presented with both a Navy "E" pennant and an Army "A" pennant on May 22. Presentations will be made by high ranking Army and Navy officers to both companies in recognition of their "meritorious service in increasing machine tool capacity and productiveness for war purposes."



International News Photo

PRODUCING NEW FORGED CYLINDER HEAD: Two machines used in making Wright Aeronautical Corp's new forged aluminum aircraft engine cylinder head are (at left) a high speed miller which cuts the fins, and (at right) the huge Greenlee automatic cylinder head transfer machine, 154 ft. long, which combines the operations of 39 separate machines. Note finished product on conveyor at bottom.



VALUABLE TO WAR EFFORT: Twenty-five tons of steel are fed daily into the jaws of this giant whale-like shear in the metal conservation department at the Westinghouse East Pittsburgh works.

Used Machinery Section In Construction Branch

Washington

• • • **Establishment of a Used** Construction Machinery Section in the Construction Machinery Branch of the Division of Industry Operations was announced on Monday by Joseph F. Ryan, Branch Chief. Hamilton O. Penn, former president of the H. O. Penn Machine Co., New York, has named head of the new section, which will survey the used construction equipment situation throughout the country and work out plans under which all available machinery can be put to use.

This Week's Priorities and Prices

Superior Metal Co., Chicago and Bethlehem, Pa., was ordered to suspend all dealings in any type of nickel by suspension order S-52. (WPB1092)

Production Requirements Plan new acting chief, appointed May 10, is Charles M. Schoenlaub. (WPB-1094)

Petroleum price schedule 88 (revised) continues until July 6 the permission for a charge of 3c. a gal. above ceilings by amendment II, effective May 8, to keep a continued supply of kerosene moving into Virgin Islands. (OPA-PM3227)

Coat hanger order L-30 amended (No. 2) to permit production of wood and paperboard hangers using a steel wire hook, effective May 9. (WPB1081)

Road building material for temporary construction may be assigned ratings under order P-19-e as a result of amendment No. 2, effective May 9. (WPB1091)

Copper scrap order, M-9-b, as amended, includes "ingots," effective May 9. (WPB-T290)

Machinery manufacturers selling on installed basis may calculate prices on March, 1942, basis for filed labor and outbound freight instead of Oct. 1, 1941, rates, according to amendment No. 1 to maximum price regulation 136, effective May 18. (OPA-PM3124)

Relaying rail maximum prices on certain lighter weights are raised by amendment No. 2 to revised price schedule 46, effective May 11. (OPA-PM3217)

Aircraft material suppliers may apply an A-1-a rating for operating supplies necessary in processing aircraft parts furnished on ratings according to amendment No. 1 to order P-109, issued May 8.

Auto replacement parts order L-4-c amended (No. 1) effective May 8, postponing prohibition of production from May 1 to May 15. (WPB1085)

Office machinery order L-54-b, amendment No. 2, modifies restrictions on distribution to enable dealers to return new equipment to manufacturers willing to accept it. (WPB-T286)

Defiance Machine Works, Inc., Defiance, Ohio, is permitted to sell 150 specified machine tools manufactured by a subcontractor at maximum prices to revised price schedule 67, amendment No. 9, effective May 7. (OPA-PM3244)

Five steel firms, under orders 3, 4, and 5, effective May 2; order 6 effective May 5; and order 7 effective April 6, under revised price schedule 6, may pass on to customers certain heavier freight costs. Amendment 3 to revised price schedule 49, effective May 5, adds Washington to "listed cities" recognized as distribution centers for iron and steel products. (OPA-PM3245)

Non-ferrous foundry products ceilings were set by maximum price regulation 125, effective May 14, based on Oct. 1 and 15 levels. (OPA-PM3246)

Special purpose premiums to copper scrap users were revoked, effective May 21, by order 1 under revised price schedule 20 because they have been replaced by the special use premium in the amended schedule. (OPA-PM3249)

Alloy iron and steel production will be subject after June 1 to monthly melting schedules to be issued, according to amendment No. 3 to order M-21-a, (WPB-1089)

P-74, which grants an A-1-c rating for materials used in heat treating furnace construction, is extended through June 30 by extension 1, issued May 14. (WPB-1096)

Electroplating and anodizing equipment, by order L-110 effective May 14, was placed under control as to production, sale, and delivery. (WPB-1101)

Thinner and less fancy glass containers, with production increased 30 per cent, is the object of order L-103, effective May 14. (WPB-1103)

Iron and steel scrap revised price schedule No. 4 was amended (No. 4) effective May 18, liberalizing provisions governing mixed shipments. (OPA-PM3275)

Revised PRP form of application for priority assistance will be used for the third quarter of 1942. (WPB-1113)

Bicycle rationing control was delegated by WPB to OPA by supplementary directive 1-G and amendment No. 2 to order L-52-a May 13. (WPB-1118)

Softwood lumber sales and deliveries by large producers of softwood "construction" lumber, except to meet Army, Navy, and Maritime Commission needs, were frozen by order L-121, effective May 13. (WPB-1119)

Scrap dealers in waste, scrap, or salvage material to industrial consumers will be licensed automatically May 20 by supplementary order 5. (OPA-PM3258)

Pollack Steel Co.'s plea for permission to raise prices on merchant bars is denied by order 8 under revised price schedule 6, effective May 8. (OPA-PM3263)

Critical material exports to other American republics will be given preference under certain conditions set up by Order M-148 effective May 12. (WPB-1107)

Golf club order, L-93, permits manufacturers to use completed fabricated plastic ferrules and caps they now have on hand by amendment No. 2 effective May 12. (WPB-1109)

Blanket road building authorization, under L-41-600 issued May 8 makes it possible for governmental road departments to continue programs by filing monthly reports of material commitments. (WPB-1111)

William L. Batt will be succeeded as director of materials by A. I. Henderson. (WPB-1114)

Tires, tubes, and automotive replacement parts are removed from supplies covered by order L-63 by exemption No. 3, effective May 12. (WPB-T305)

Machines price regulation 136 has been postponed for two weeks by amendment No. 2, effective May 16. (OPA-PM3311)

Form PD-25-x is discontinued after May 23 because standard applications under PRP have been simplified. A revised form of PD-25-a will continue in use. (WPB-1129)

Copper order M-9-c was amended to permit sale of frozen brass or wire mill products without obtaining WPB approval, May 15. (WPB-1131)

Air conditioning and commercial refrigeration equipment installations were stopped except on rated orders by order L-38, effective May 15. (WPB-1132)

Farm machinery firms' surplus inventories of iron and steel were taken under WPB control by order L-26-b, issued May 15. (WPB-1133)

Lamp manufacturing restrictions of order L-33 do not apply to repairing, re-covering, retrimming or relining shades in which no new metal frame is used, according to Interpretation No. 1 issued May 15. (WPB-1134)

Gold and silver mine reference in order P-56 has been eliminated by amendment No. 2, issued May 15. (WPB-1135)

Metal home furniture order L-62 was amended (No. 2) May 14 to permit use of iron and steel contained in manufacturers' inventories prior to March 20, provided that such inventory consisted of parts so processed as to be worthless for any other purpose. (WPB-1142)

Pencil order, L-113, amendment No. 1, prohibits use of any finishing materials for pencils containing any pigments other than those specified. (WPB-1143)

Eleven merchandise items were exempted from inventory limitation order L-63 by interpretation No. 1 issued May 15. (WPB-1144)

Machine tool purchasers must include in their orders sufficient detailed information to enable producers to place tools in production schedule, according to interpretation No. 1 of order E-1-b, issued May 15. (WPB-1145)

Farm equipment was removed, by amendment No. 1,

issued May 15, from the list of critical materials subject to terms of M-148, giving preferential treatment to purchase orders accompanied by an export license to Latin America. (WPB 1150)

Aluminum Co. of America, beginning June 15, will make substantial reductions in prices of fabricated aluminum products. (OPA-PM 3296)

"Concentration of Production" principle, ordering (L-23-c effective May 15) an end to domestic cooking appliance manufacture by large producers after July 31 and permitting production of a limited number of simplified models by small companies for civilian use. (WPB-1116)

Freight car producers may accept deliveries of parts and materials from suppliers if not subject to other rated orders by amendment No. 1 to order L-97-a-1, issued May 13. (WPB-1123)

Acrylonitrile, a Buna N type oil-resistant synthetic rubber, is placed under complete allocation control by order M-153, issued May 14. (WPB-1124)

Anti-freeze production will be placed upon a quota basis by order L-51, issued May 14. (WPB-1125)

Copper and brass mill repair and maintenance parts suppliers are given an A-1-c rating by an amendment to P-106, effective May 14, to enable them to replenish inventories when they have filled orders from the mills bearing an A-1-c or higher rating. (WPB-1127)

Cashew nut shell oil in manufacture of brake linings, except for Army and Navy, was prohibited by amendment No. 1 to order M-66, issued May 14. (WPB-1136)

Increased transportation costs involved in keeping New York and New England industry supplied with bituminous coal in the face of dislocation of normal tidewater by vessels from Hampton Roads, Va., will be absorbed by the Federal Government. (OPA-PM 3338)

PRP specialists have been assigned to WPB field offices. (WPB-1155)

Bicycle shipments to distributors by manufacturers were permitted by ration order 7, effective May 15, for rationed distribution which will begin in about 3 weeks. (OPA-PM 3320)

Pricing method for solid fuels was established by amendment No. 1 which reinforces the maximum price regulation 122, effective May 18, and covers sales which might not have been covered by the original regulation. (OPA-PM 3321)

Construction order L-41 was amended, effective May 16, providing three minor changes in the text of schedule A. (WPB-1146)

Sperm oil was placed under complete allocation control by amendment No. 1 to order M-40, effective May 16, 1942. (WPB-1149)

Resources Protection Board to evaluate the relative wartime importance of all industrial plants, war installations, facilities, and vital economic resources and make recommendations for their protection was named. William K. Frank was appointed chairman. (WPB-1152)

Oil industry order P-98, which provides priority assistance, extended until July 1. (WPB-T319)

Plumbing fittings and valves restrictions in connection with Navy and Maritime Commission vessels were removed by amendment 1 to schedule I of order L-42 and amendment 2 to schedule II of order L-42, effective May 16. (WPB-T320)

Metal plastering bases may not be produced for direct war contracts in addition to quotas by amendment No. 1 from order L-59, effective May 16. (WPB-T321)

• • •

For copies of above announcements address Division of Information, WPB (or OPA), Washington, giving announcement number as shown in parentheses after each paragraph. (For example, WPB-600 *means announcement* 600 *issued by the War Production Board.)*

Revisions for the Iron Age Priorities Guide

• • • The following data, together with all intermediate weekly revisions in THE IRON AGE, should be added to THE IRON AGE Priorities Guide published with the issue of March 26 to bring the Guide up to date: (Watch for the new IRON AGE Guide)

Under "P Orders," page 5, add:

P-56...Amendment No. 2 eliminates special reference to gold and silver mines from order providing high rating only to mine operators with serial numbers granted by WPB. (5-15-42)

P-90...Elimination of the use of application form PD-25-x announced, after May 23. (5-15-42)

P-98...Amendment provides for a new procedure for granting rating to the petroleum industry, to be announced before July 1, and extension of order until July 1. (5-16-42)

P-106...Amendment gives suppliers of maintenance and repair materials to copper and brass mills an A-1-c rating to replenish inventories, effective May 14 and expires June 30, 1942. (5-14-42)

Under "M Orders," page 9, add:

M-9-c...Amendment permits frozen brass or wire mill products to be sold to other brass or wire mills with WPB approval and includes "Locks" on list "A-1" of order instead of on list "A." (5-15-42)

M-40...Amendment No. 1 places sperm oil under complete allocation. Monthly requests for allocation filed on form PD-481 and May 31, 1942, inventories reported on form PD-482. (5-16-42)

M-66...Amendment No. 1 prohibits use of cashew nut shell oil in manufacture of brake linings. Application for use, delivery, or acceptance of material authorized on form PD-271. (5-14-42)

M-148...Amendment No. 1 removes farm equipment from list of critical materials. (5-15-42)

M-153...Allocates Acrylonitrile. the Buna N type, oil-resistant, synthetic rubber. (5-14-42)

Under "L Orders," page 12, add:

L-26-b...Assumes control of disposition of surplus iron and steel inventories held by farm machinery and equipment manufacturers. Authorization to sell such inventories given on form PD-478, application for which is filed on PD-479. (5-15-42)

L-33...Interpretation No. 1 states that order does not apply to repairs, etc., in which no new metal frame is used on electric lamps and shades. (5-15-42)

L-38...Bans new installations of air conditioning and commercial refrigeration equipment except on government authorization or preference ratings and restricts manufacture and sale on rated orders. (5-15-42)

L-41...Amendment to order placing construction under rigid control exempts orders of P-55 series from order, omits P-115 and its related form PD-285, and makes other changes. (5-16-42)

L-51...Places production of anti-freeze on quota basis, except quantities made for governmental agencies, Lend-Lease, and for other governments specified. (5-14-42)

L-62...Amendment No. 2 permits use of iron and steel inventories prior to March 20 or metal household furniture manufacturers if such material is so processed as to be worthless for any other purpose. (5-14-42)

L-63...Interpretation No. 1 exempts 11 items from restrictions of order. (5-15-42)

L-97-a-1...Amendment No. 1 permits freight car producers to accept deliveries of materials from suppliers if material is not subject to other rated orders. (5-14-42)

L-113...Amendment No. 1 prohibits use of certain finishing materials for pencils. (5-15-42)

Under "E Orders," page 14, add:

E-1-b...Interpretation No. 1 requires that a purchase order for machine tools be accompanied by sufficient information to enable producer to place the tool in his production schedules. (5-15-42)

Under "P Orders," page 5, add:

P-19-e... Amendment No. 2 permits assignment of ratings for material to be used in temporary road constructions or used during construction. (5-9-42)

P-19-i... Interpretation No. 1 orders suppliers of materials used in construction of aluminum and magnesium plants that deliveries should be made on schedule even though subscquent orders under the order carry higher ratings . (5-6-42)

P-74...Extension No. 1 extends order through June 30 when holders of P-74 ratings must qualify under PRP. (5-11-42)

P-90... Application for priority assistance under PRP during the third quarter will be on a revised form of PD-25-a. Old forms are to be used with specified changes made on the forms by applicant. (5-13-42)

Under "M Orders," page 9, add:

M-21-a... Alloy iron and steel, by amendment No. 3, after June 1 will be subject to monthly melting schedules. Purchasers must accompany each order with a statement giving end use to which materials will be put. Monthly melting schedules filed on forms: PD-391, PD-391-a, and PD-440. (5-11-42)

M-60... Amendment No. 1 permits limited use of high lauric acid oils in food products during summer months. (5-11-42)

M-115... Amendment No. 1 appoints Tin Salvage Institute, 411 Wilson Avenue, Newark. N. J. (5-11-42)

M-148... Sets up export program to other American republics, requiring producers to make delivery within period specified in the export license. (5-12-42)

M-149... Removes inventory restrictions on phosphate rock to permit consumers to take advantage of any available transporation facilities. (5-11-42)

Under "L Orders," page 12, add:

L-23-c... Orders end to domestic cooking appliance production by large producers after July 31 and permits output of a limited number of simplified models by smaller companies for civilian use. Specifies 39 areas in 15 states where production must cease after July 31. (5-14-42)

Acid Open Hearth Research Association Is Organized

Pittsburgh

• • • **A new research group** known as the Acid Open Hearth Research Association, has been formed with a temporary committee of eight metallurgists and research workers. The organization will institute a comprehensive program for the investigation and research of melting and operation problems in acid open hearth steel furnaces.

A membership drive is already under way and the temporary committee which will take charge until permanent officers are installed later includes the following: H. G. Grim, chairman, works manager, Heppenstall Co.; Dr. F. H. Allison, vice chairman, chief research metallurgist, United Engineering & Foundry Co.; F. C. T. Daniels, secretary, vice president, Mackintosh Hemphill Co.; R. C. Heaslett, treasurer, chief research metallurgist, Continental Roll & Steel Foundry Co.; J. S. Baldwin, superintendent of open hearths, Standard Steel Works, Burnham, Pa.; A. R. Altman, superintendent of open hearths, Heppenstall Co.; J. L. Nichols, superintendent of open hearths, Railway Steel Spring Co., Latrobe, Pa.; W. H. White, general superintendent, Pittsburgh Rolls Co.

The new association will draw membership from about 50 to 60 foundries, forges and steel mills which operate acid open hearth furnaces. It is expected that two full time metallurgists will be engaged by the association and that two fellowships will also be established.

J. P. Maguire Heads New York Area WPB

Washington

• • • **John P. Maguire,** East Orange, N. J., president of the John P. Maguire Co., commercial textile factors in New York, took up his job on Monday as WPB regional director for New York state and northern New Jersey. His office is located in the Chanin Building, 122 East 42nd Street, New York. Mr. Maguire is the seventh regional director to be appointed in the establisment of WPB regional offices.

SWOC Heavily Favored In U. S. Steel Elections

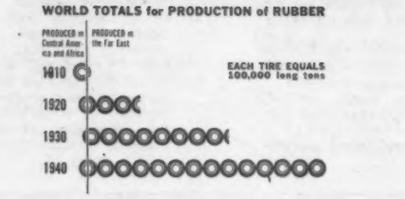
Pittsburgh

• • • **The SWOC** polled a landslide in its favor last week at NLRB supervised consent elections held at 26 U. S. Steel Corp. subsidiary plants throughout the country—17,486 employees voted in favor of SWOC and 1,032 against, giving a ratio of 95 per cent for and 5 per cent against. These results gave the SWOC a larger majority than it received in previous elections at large steel plants. More votes will be cast within the next few weeks covering such companies as Carnegie-Illinois Steel Corp., Tennessee Coal, Iron & Railroad Co., National Tube Co., and additional units of American Bridge Co. According to observers here, the same trend in SWOC's favor will continue and will result in this union becoming exclusive bargaining agent for employees in U. S. Steel Corp.'s steel and fabricating units.

A consolidated tabulation of the votes cast follows:

Company	No. of Plants	For SWOC	Against SWOC
American Steel & Wire	15	17,486	1,032
Scully Steel Products..	3	427	6
American Bridge Co....	2	277	9
Columbia Steel	3	2,942	156
Universal Atlas Cement	2	535	23
Virginia Bridge	1	357	5
Total	26	22,024	1,231
Per cent of total votes cast		95	5

RUBBER IMPORTS: To get rubber into the United States today, ships must travel 3392 submarine-infested miles from Para, Brasil, to New York or 9058 miles through waters largely controlled by the Japanese from the Far East to Los Angeles. In 1941, more than 1,000,000 long tons of rubber were imported into the United States, 98 per cent of which came from the Far East.



April Ore Consumption Per Day a New Record

Cleveland

• • • **Consumption of Lake Superior** iron ore during April, 1942, broke all records for daily consumption by averaging at the rate of 226,884 gross tons for a total of 6,806,529 gross tons. The monthly total, however, was below the March, 1942, figure of 6,899,667 gross tons, which had been exceeded in January, 1942, when an all-time record of 6,960,303 gross tons of iron ore were consumed, according to the Lake Superior Iron Ore Association. Although monthly pig iron production figures have been discontinued, the April consumption rate of iron ore would indicate the likelihood that pig iron production during last month may also have broken previous daily average records.

On May 1, 1942, total stocks of iron ore at U. S. furnaces and on the United States of Lake Erie amounted to 20,694,579 gross tons, as against 19,550,606 gross tons a month earlier and 16,482,766 tons a year earlier. This is a net improvement in our inventory figure, despite the consumption of 26,899,347 gross tons of iron ore by our furnaces up to May 1, 1942, which was a heavier rate of consumption than in 1941 when 23,741,465 gross tons were consumed in the first four months.

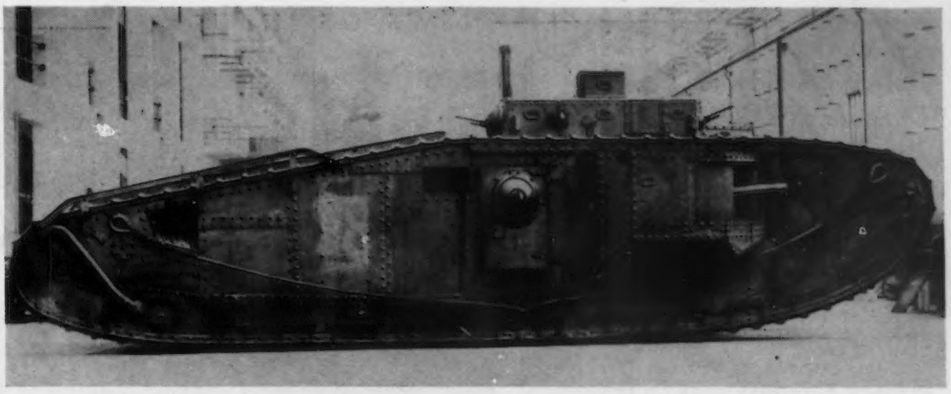
U. S. blast furnaces in operation, depending principally on Lake Superior ore, totaled 174, on May 1, 1942, as compared with a corrected total of 175 furnaces a month earlier and 150 furnaces a year earlier. On May 1 there were only 7 U. S. furnaces idle, as compared with 29 a year earlier. Seven Canadian furnaces depending principally on Lake Superior iron ore were operating May 1, but the rate of consumption has not been released by the Canadian censors.

Shipyard Expediters Sought

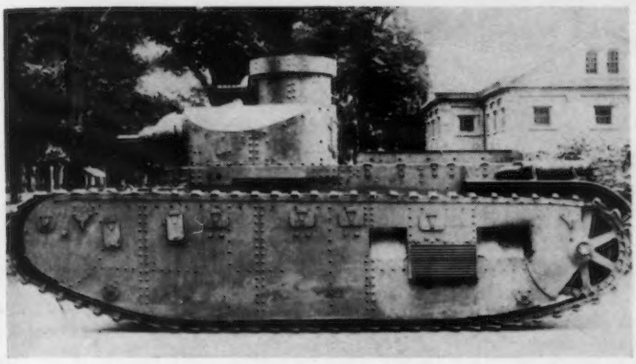
• • • **The U. S. Civil Service** Commission at New York is seeking expediters immediately for Maritime Commission projects. It is desired that applicants have several year's shop experience plus knowledge of factory routing procedure, etc. The jobs will pay around $3,200 per year.

Evolution of the Tank

U. S. Signal Corps Photos

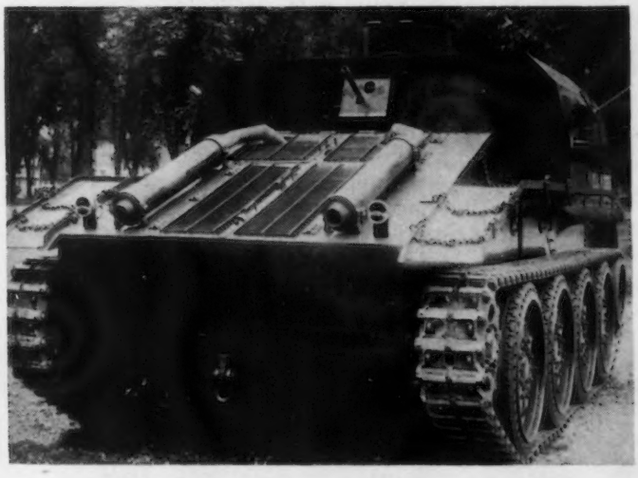


GRAND-DADDY OF THE BIG ONES: This British developed, "Mark VIII," the famous 44-ton World War I tank carried a crew of nine. Unlike later tanks, its tracks had no suspension mounting, making it necessary for the tank to take each bump. Top speed was 4 to 6 miles an hour.

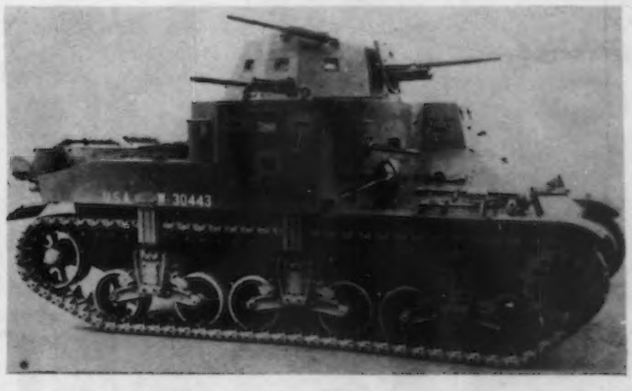


T1, 1927 EDITION: This medium model, T1, was built at the army's Rock Island arsenal in 1927. It had two turrets with a machine gun in each, had wooden tracks, and weighed about 23 tons.

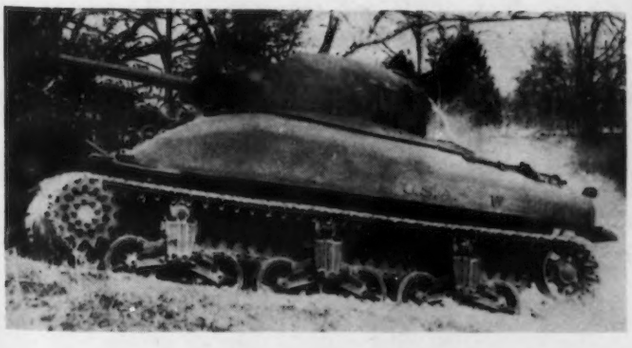
MEDIUM TANK, T2: The T2 was built in 1932 with steel tracks and one turret housing a 37 mm. cannon. It was heavily armored over the bogey wheels, but this feature was dropped in later models.



THE CHRISTIE: This barbette type medium tank, built in 1936, is known as the Christie. It bristled with a machine gun on each side of its rectangular turret. Note the Christie-type suspension, continued use of the steel track similar to what is used on the present day Japanese light tank and the solid rubber construction of the wheels.



PREDECESSOR OF M-3: The T5 medium tank, built in 1938, resembles the present M-3. This rolling fort has an octagonal turret, carries a 37 mm. cannon and eight machine guns. The rubber tracks and bogey wheels are similar to those on later tank models.



M-4, THE LATEST AND DEADLIEST: This sleek 28-ton chunk of destruction with rounded hull that sheds shells like a duck sheds water is the newest and deadliest version of tank construction, the M-4. It carries a 75 mm. cannon in a power-operated turret that permits firing at any angle. It also carries four machine guns. This photo was made at Fort Knox, home of the armored forces.

Detroit SAE Hears Designer of P-40

Detroit

• • • **Recalling that** the first stressed skin all-metal aircraft design was submitted for Government approval only about 13 years ago, Don R. Berlin, aeronautical engineer for General Motors Corp., addressed members of the Detroit section, Society of Automotive Engineers, here last week on the subject: "Designing Aircraft for War Production." He was introduced by R. C. Gazley, now an engineer in the industry, who handled the Government study of the all-metal plane, then with the U. S. Department of Commerce, when it was first submitted.

Present at the meeting was Charles A. Lindbergh, of Ford Motor Co., who thus made his first public appearance since his recent connection here with the Ford company. The meeting was in the Horace H. Rackham memorial here.

Berlin, comparing pursuit plane designs of 20 years ago with those of today, said that modern planes are three times as heavy, three times as powerful and three times as fast, but have only one-third the drag (wind resistance) of their earlier counterparts. The rate of increase in top speed approximates one mile per hour, per month, through these years, he pointed out. Berlin, noted as designer of the Curtiss P-36 and P-40 series of airplanes, outlined for the automotive group the process normally followed in laying out, tooling and building aircraft, and explained differences which have arisen since the auto industry took over large parts of the airplane manufacturing program for the Government.

AIRCRAFT MEETING: A. J. Fisher, General Motors Corp.; Charles A. Lindbergh, Ford Motor Co.; and Clarence W. Avery, Murray Corp. of America, attended the SAE meeting in Detroit last week. "Designing Aircraft for War Production," was the theme of the meeting.

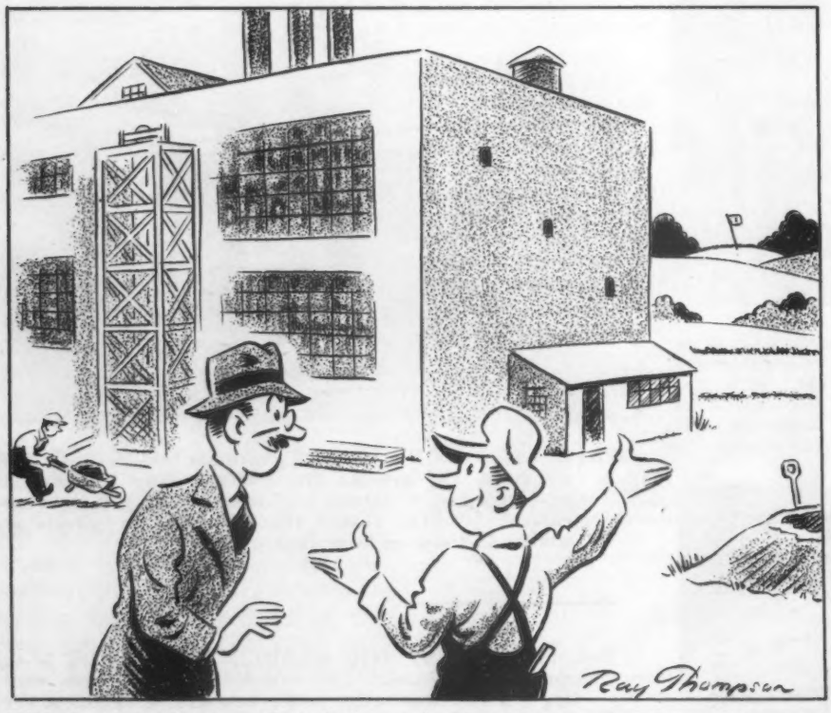
Government Asks Redesign To Save Reinforcing Bars

Pittsburgh

• • • **The government** has asked engineering firms to redesign construction projects for the least possible amount of concrete reinforcing bars, according to reports here. Such projects include necessary municipal improvements, housing projects, and other jobs which carry ratings of A-2 or less. One such project was redesigned, saving approximately 400 tons of concrete bars from an original requirement of 500 tons.

Foster Publishes Booklet on Cylindrical Superfinishing

• • • **A 140-page working manual** on "Cylindrical Superfinishing" has just been published by the International Machine Tool Corp., Foster Division, Elkhart, Ind. IMT was the first to build Superfinishers to carry out the process developed by Chrysler Corp. for producing a refined finish on metal surfaces that reduces friction and adds to the life and operation of all types of machines. Part I treats of surface defects and their effects upon bearing operation; part II, the control of the Superfinishing operation. The latter section contains considerable data on stone selection and the Foster-Rockwell bond hardness test for stones, as well as data on stone pressure, stone oscillation and lubrication of the abrasive.



"The Army decided to make it look exactly like a factory—they figger the enemy'll bomb that golf course across the way!"

PERSONALS . . .

• **George A. Higgins** has been appointed manager of sales, bar, strip and semi-finished materials division, Carnegie - Illinois Steel Corp., Pittsburgh, to succeed L. B. Worthington who was recently elected vice-president of Scully Steel Products Co., Chicago. Mr. Higgins entered the employ of the Carnegie Steel Co. as a clerk in the bar bureau in September, 1919, becoming a salesman in the Pittsburgh district sales office of the company three years later. In 1934, he was named assistant manager of the Pittsburgh district sales office and on June 1, 1938, he was made assistant manager of the bar bureau, which position he held until his present appointment.

GEORGE A. HIGGINS, manager of sales, bar, strip and semi-finished materials division, Carnegie-Illinois Steel Corp.

• **B. C. Gould** has been named assistant to **C. W. Avery,** president of the Murray Corp. of America. Mr. Gould has been a staff member and partner of the firm, Stevenson, Jordan & Harrison, management consultants. **Charles H. Widman** has retired from active duty as vice-president in charge of sales. Mr. Widman was one of three young men who with their father, **J. C. Widman,** organized the J. C. Widman Co., furniture manufacturers, just after the turn of the century. This company supplied 80 per cent of the plywood panels used in the manufacture of war planes in World War I and undertook the manufacture of automobile bodies, including the first of the Chrysler series. In 1925 the Widman company was merged with the Wilson Body Co., Towson Body Co. and the Murray Stamping Co. to form the basis for the present Murray Corp. Mr. Widman became vice-president in charge of sales shortly after the merger and held the post until his recent retirement.

• **Ira A. Terry,** for the past two years assistant to J. D. Harnden, engineering assistant to the manager of General Electric's largest plant, has been appointed general assistant to H. A. Winne, G-E vice-president in charge of design engineering, Apparatus Department. **Walter C. Heckman** of the G-E turbine engineering department has succeeded Mr. Terry in the works manager's office.

• **C. R. Owens** and **R. W. Steenrod** have been appointed welding specialist and industrial heating specialist, respectively, of the General Electric Pacific District. Simultaneously the appointments of **A. D. Boardman** as Pacific District industrial control specialist, and **L. E. Donahue** as industrial control specialist at the Los Angeles office were announced.

• **Edward Noe,** formerly of the patent law firm Marechal & Noe, has been made secretary of the Sheffield Corp., Dayton, Ohio. For many years Mr. Noe has handled Sheffield's patent problems, and in his new position he continues this work. **John P. Bernard,** vice-president and assistant general manager of the Sheffield Corp., formerly vice-president in charge of operations of Dyer Engineers, Inc., Cleveland, has been appointed a director of the company.

• **Arthur W. Davis** has been appointed comptroller of the American Steel & Wire Co., subsidiary of U. S. Steel Corp. His first business connection was with the American Products Co., Cincinnati, where he served as comptroller, assistant secretary, treasurer and director from 1923 to 1927. Since 1938 Mr. Davis has been treasurer and director of the Electric Household Utilities Corp., Chicago, and its subsidiary companies.

• **Edward Riley** has joined the staff of the Automotive Council for War Production and has been assigned to the Tank, Combat Car and Parts Division.

• **Charles J. O'Connor** has been elected president of Reichhold Chemical Co., Inc., succeeding **H. Reichhold** who becomes chairman of the board and will continue as general manager of all Reichhold plants.

• **Allan S. Lehman** has been elected a director of the Studebaker Corp. Mr. Lehman is a partner of Lehman Brothers, a vice-president and a director of Lehman Corp., a director of Southern States Land & Timber Co. and General Realty & Utilities Corp.

• **William L. Wilson** has been named director of the new industrial relations department of Republic Aviation Corp., Farmingdale, N. Y. **T. W. Macdonald** has succeeded Mr. Wilson as director of public relations. **E. Trevor Hill** and **Lewis M. Tansky** have recently been added to the company's public relations staff and will function under Mr. Macdonald.

• **A. L. Kress** has joined Republic Aviation Corp., Farmingdale, N. Y., with the title of assistant to the president. Mr. Kress, who has most recently been consultant to the member companies of the Aeronautical Chamber of Commerce on job-classification and evaluation problems, has been assigned to the supervision of a newly-organized department of industrial relations which will handle the company's personnel, educational, employment and public relations.

• **A. J. Moses** has been elected a vice-president of Combustion Engineering Co., Inc., New York. Mr. Moses, a graduate of Georgia School of Technology, has been connected with Combustion Engineering Co., or its constituent companies, since 1920 and for several years past has been general manager of the Company's Hedges-Walsh-Weidner Division at Chattanooga.

• **Francis J. Burtt** has been appointed director of industrial relations of the American Steel & Wire Co. He succeeds **E. W. Kempton,** who has been transferred to the United States Steel Corp. of Delaware. Mr. Burtt became associated with the American Steel

& Wire Co. in 1927, as a draftsman at the Donora, Pa., wire works. In June, 1933, he was made assistant to the master mechanic at the same plant, becoming foreman in the electric welding and field fence department in 1937. The following year he was appointed superintendent of wire and wire products at Donora and was transferred in 1941 to Cleveland as assistant director of industrial relations, which post he has held to the present time.

• **L. S. Hamaker** has been appointed assistant general manager of sales of Republic Steel Corp., Cleveland. This will be a transfer from his position as general manager of the Berger Mfg. Co. division of Republic at Canton, Ohio. He has been connected with the company and its predecessor companies for many years and was at one time operator of a billet pusher on a bar mill heating furnace in one of Republic's Canton mills.

• **John A. Brookbank,** manager of the Indianapolis branch of the International Harvester Co., has retired after 44 years of service and will be succeeded by **Lloyd W. Hully,** district sales manager in Chicago.

• **Hiram W. Hascall,** sales promotion manager for the Heinn Co., Milwaukee, has resigned to become an inspector for the Navy Department in the Chicago area.

• **Gail E. Spain** has been appointed vice-president and **John Q. McDonald,** general sales manager of the Caterpillar Tractor Co., Peoria, Ill. Mr. Spain, who has been general sales manager since November, 1940, succeeds the late D. G. Sherwin and will move to Caterpillar's San Leandro, Cal., office to direct activities there and coordinate operations with those in Peoria. Mr. McDonald has served as export sales manager since May, 1940.

• **George G. Stoner** has been named to the technical staff of Battelle Memorial Institute, Columbus, Ohio, and has been assigned to chemical research. Dr. Stoner, a graduate of Wooster College, of Ohio State University, and of Princeton University, was associated with the Pittsburgh Plate Glass Co., Barberton, Ohio, prior to joining the Battelle staff.

• **George S. Cooper** has been elected executive vice-president of the Diamond Alkali Co., Pittsburgh. For the past five years Mr. Cooper has been vice-president in charge of sales.

• **Robert M. Zacharias,** formerly of Church & Church, patent attorneys of Washington, D. C., has recently become associated with the McKenna Metals Co., Latrobe, Pa.

• **William D. West** has been appointed sales representative in western South Carolina with headquarters in Greenville, S. C., of the Magnus Chemical Co., Garwood, N. J. **Edwin M. Tait** has been named sales representative covering Minnesota and South Dakota with headquarters at Minneapolis.

• **Robert E. Mason,** formerly with the International Nickel Co. and Peter A. Frasse & Co., Inc., New York, has joined the sales department of the Tube Reducing Corp., Wallington, N. J.

• **John J. Fitzgibbon** has changed positions from foundry engineer for the Whitehead Metal Products Co., New York, to metallurgist for R. Hoe & Co., Dunellen, N. J.

• **George Livermore,** for many years special representative of the B. F. Goodrich Co., Akron, Ohio, on products for the oil pipe line and oil distributing agencies in the southwest, has been named district manager at St. Louis to succeed John S. Gulledge, who has resigned to enter the Army Air Corps.

• **William Watson,** vice-president of manufacturing at the Allis-Chalmers Mfg. Co., Milwaukee, since 1932, has announced his retirement after having been with the firm since its organization in 1901. For the duration of the emergency Mr. Watson has offered his services in an advisory and consultant capacity where required.

• **Carl A. Kelley,** former field sales engineer for the Harnischfeger Corp., Milwaukee, at Sullivan, Ind., has been appointed a technical advisor to the Mining Branch of the War Production Board for Illinois and Indiana.

• **J. A. Elwood,** former division superintendent of the Nash Motor Corp., Racine, Wis., has been made general works manager of the Gorton Machine Co., Racine. He was with Nash for 19 years and previous to that time had been with Sunstrand Machine Tool Co., Rockford, Ill., and the Ajax plant of the Walker Mfg. Co., Racine.

OBITUARY . . .

• **Morris S. Towson,** president and general manager of the Elwell-Parker Electric Co., Cleveland, died in Orlando, Florida, on March 17. He was 76 years old. For several years, Mr. Towson was associated with the Brown Hoisting Machinery Co., Cleveland. In 1893 a separate company was organized to build the Elwell-Parker motor under British license, and Mr. Towson was placed in charge.

• **William Fleming, Jr.,** president of the Shaler Co. and its affiliates, the National Rivet & Mfg. Co. and the Midstate Mfg. Co., all at Waupun, Wis., died from a heart attack. He was 62 years old. In 1920 he became an executive of the Interstate Pipe Co., Pittsburgh, and several years later acquired an interest in the Shaler Co., acting as secretary. He was made president in 1936.

• **R. P. Smith,** works manager, Steel Peech & Tozer, branch of the United Steel Companies, Ltd., Sheffield, England, died March 19. Mr. Smith, among his great number of friends and associates in this country, was considered to be one of the best informed and best representatives of the British iron and steel industry and an authority on production of special steels.

• **Bernard Duchscher,** a civil engineer for the Peter Loftus Engineering Co., died in Cleveland, May 4, aged 73 years. After employment with a French engineering firm in China for many years he came to the United States to work for the Brown Hoisting Machinery Co., now Industrial Brownhoist Corp. He was also employed by Atlas Car & Mfg. and the Wellman Engineering Co., both of Cleveland.

• **William G. Houck,** president of the Buffalo Structural Steel, died May 5. He was 70 years old. In 1895, Mr. Houck was appointed treasurer and chief engineer of the firm, and was elected president shortly thereafter. Until 1937 he served as president of the Buffalo Steel Fabricator's Association. He was a director of the National Gypsum Co.

• **J. L. Peters,** owner of the J. L. Peters Co., structural steel and iron manufacturers, Detroit, died recently, aged 42 years.

NON-FERROUS METALS

. . . MARKET ACTIVITIES AND PRICE TRENDS

Fabricated Aluminum Price Cut Effective June 15

• • • **Substantial reductions** in fabricated aluminum prices, have been made by the Aluminum Co., of America. The price cuts range from more than 20c. a pound on some of the higher cost fabrications down to 1c. a pound in cases where the margins are small. Particularly significant reductions are announced in prices of 24S sheet and plate and forgings going into aircraft production. The reductions are effective June 15, regardless of prices quoted in existing contracts.

The reductions were made at the request of the government, which plans to ask other fabricators to make similar cuts.

Brass ingot prices in certain grades have been reduced ½c. to ¾c. a pound by the Federated Metals Division of American Smelting & Refining Co., effective immediately. A ½c. reduction is announced for the 88-10-2 group, with ingot numbers from 200 to 255 inclusive, except for No. 225 which is now ¾c. less. The aluminum, magnesium and bronze groups, including all ingot numbers from 415 to 424, have been reduced ¾c, and all special alloys based on the 88-10-2 formula are down ½c. per pound.

This action by Federated Metals was taken on the company's own initiative and was followed by similar reductions on the part of the other leading producers.

Refined copper production during April rose to 90,672 tons, a new record, while crude production hit a five-year high at 94,314. The figures, as reported by the Copper Institute, also show refined stocks up as of the end of April to 83,789 tons, an increase of 4,252 tons.

Definite action by WPB to move copper inventories frozen by recent conservation orders is under way. Some 100,000 fabricators will receive notices from the inventory and requisitioning branch designed to give WPB a complete picture of copper inventories on hand in nonessential industries. It is estimated that 255,000 tons of copper and 45,000 tons of zinc will be purchased by the Copper Recovery Corp., a metal reserve subsidiary organized especially for the purpose. A price schedule has been set up designed to give owners a fair return, and prices of fabricated products will amount to as much as two and a half times their value as scrap. Requisitioning will probably follow failure to accept the established prices.

The tentative prices per pound of some of the more important items are as follows:

Copper, hot or cold rolled, 19c. to 30c.

Copper, rolls and strip, 17c. to 30c.

Brass and bronze, except nickel silver and phosphor bronze, in sheets, rolls and strip, 18c. to 28c.

Copper, cold drawn rods and bars, 17c. to 28c.

Brass and bronze rods and bars, 14c. to 22c.

Copper, extruded shapes, 19c.

Brass and bronze, except nickel silver, 18c.

Scrap and ingot and refinery shapes will be paid for at OPA ceiling prices.

Non-Ferrous Prices

(Cents per lb. for early delivery)

Copper, Electrolytic[1]	12.00
Copper, Lake	12.00
Tin, Straits, New York	52.00
Zinc, East St. Louis[2]	8.25
Lead, St. Louis[3]	6.35

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered; virgin, 99 per cent plus, 15c.-16c. a lb.; No. 12 remelt No. 2, standard, 14.50c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt; Asiatic, nominal, New York; American, 14.50c. a lb., f.o.b. smelter. QUICKSILVER, $197 to $199 per 76 lb. flask, f.o.b. shipping point. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.

MACHINE TOOLS

. . . SALES, INQUIRIES AND MARKET NEWS

Cancellations of Machines Follow Over-Ordering Splurge

Cleveland

• • • **This week ushered in** two conflicting developments influencing the machine tool market, with a fourth wave of buying started on the one hand and an impressive number of cancellations of previously outstanding orders on the other hand. With many manufacturers of machine tools and as well as of previously non-defense materials preparing for expansion of new facilities to aid our war effort, new sizable orders have resulted and will continue to be placed over the near future. Meanwhile, a readjustment period is taking place with respect to the heavy orders placed in the helter-skelter buying of March. In numerous instances where over-ordering had occurred so that purchases would be on the safe side, a more realistic appraisal of requirements has been forthcoming. In addition, the successful efforts of defense contractors to secure idle machines or increase the number of subcontractors have obviated the necessity for many new machines. Moreover, there has been some shuffling around of orders due to purchasers shopping around for the earliest available equipment regardless of make.

An interesting aspect of the causes for machine tool order cancellations was one instance where a recipient of a government "letter-of-intent" was subsequently informed by the War Department that since his conversion into war production would require too much time, other arrangements had been made and the letter-of-intent would have to be cancelled.

The Ordnance Department here has been notified that the shortages of material developed in recent weeks makes unnecessary a good deal of the previously existing pressure for early deliveries of machinery. This would seem to indicate that the trend which George H. Johnson, president of the National Machine Tool Builders Association, had predicted a few weeks ago (see THE IRON AGE, May 7), has already developed.

An Ohio machine tool manufacturer has arranged for the construction of a new plant, although its present plant is only operating on the basis of one and a fraction shifts. This company has been desperately attempting to hire and train sufficient men to permit three-shift, seven-day operations.

Recent expansions in this area are being made by the Breckenridge Machine Co., the Broden Construction Co., and the Fawick-Airflex Co., Akron, Ohio, with the latter concern arranging for the remodeling and equipment of an idle factory building here.

WPB Offices List Needs

Chicago

• • • **An especially urgent need** for thread grinding machines and B&O hand screw machines for processing important war work is reported by the local WPB contract distribution offices. The thread grinding facilities are required for 2000 pieces of shell fuze components in sizes ranging from 5/16 to 1¼ in. in diameter, 24 thread and maximum length ½ in. These parts are of hardened alloy steel and carry an A-1-a priority. Plants having facilities for handling this material are requested to get in touch immediately with the Chicago WPB office, referring to job No. 29-A-514.

The Milwaukee WPB office is in immediate need of six No. 4 B&O hand screw machines, or equivalent motor driven units, of 1 in. capacity. Reconditioned or used machines in good condition can be used. Inquiries concerning this job should be addressed to the Milwaukee WPB office, referring to job No. WP281.

Commerce Department Issues New Simplified Practices

Washington

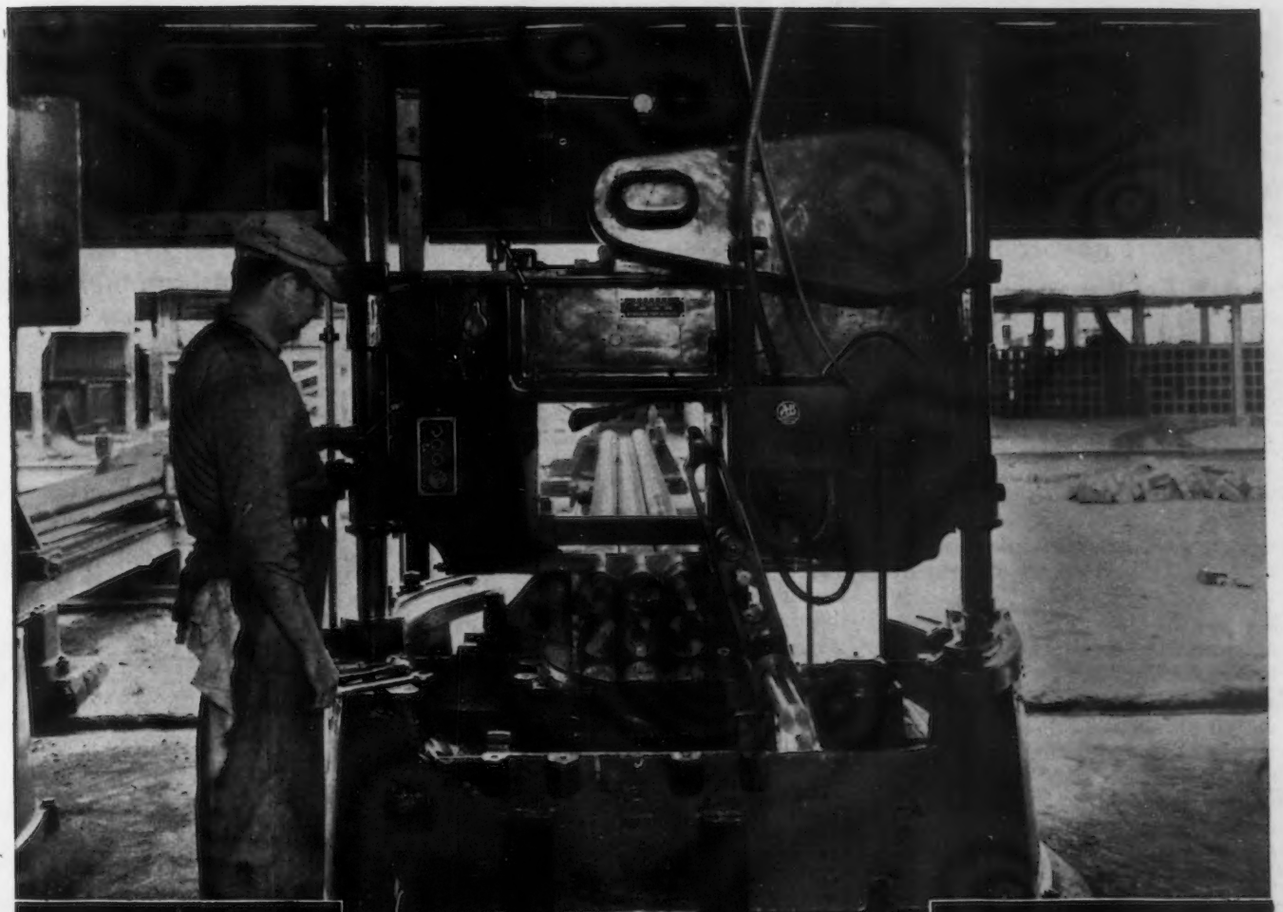
• • • **A number of new and revised** simplified practice recommendations have recently been announced by the Division of Simplified Practice, Bureau of Standards. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, at the prices given, with a discount of 25 per cent for 100 or more copies.

Roofing Ternes: Simplified practice Recommendation R30-42. The original recommendation, made in 1925, established seven weights of coating for roofing ternes, ranging from 8 to 40 lb. The current revision reduces the number of weights of coatings to three—8, 20 and 40 lb. per double base box. Each 14 x 20 in. and 20 x 28 in. sheet is to have the weight of its coating embossed upon it. No roofing terne to be manufactured lighter than IC gage (107 lb. per base box). R30-42, price 5c.

Eaves Trough, Conductor Pipe and Fittings, and Ridge Rolls: Simplified Practice Recommendation R29-42. The current revision eliminates double bead eaves trough in the 4, 5, 6 and 7 in. sizes, together with all accessories such as miters, end pieces, hangers, etc. in all grades of material. The Standards Committee estimates that this revision will eliminate more than 275 items. R29-42, 5c.

Pipe Fittings: Simplified Practice Recommendation R185-42. The simplified schedule lists but 1311 of the former 4964 gray cast iron fittings, only 1169 of the original 2331 malleable iron fittings, unions and union fittings, and 487 of the former 1271 brass or bronze screwed fittings, etc. By reducing the total variety of items 35 per cent, 92 to 94 per cent of normal demand will be satisfied. The Division of Industry Operations of the WPB has included the recommended sizes and types in schedule II of limitation order No. L-42. R185-42 may be obtained for 10c.

Files and Rasps: Proposed Revision of Simplified Practice Recommendation R6-40 is now before industry for acceptance. This revision supplements the original data on standard lengths and types of each file with detailed dimensional standards covering width, thickness, range of file teeth per inch and tolerances. The revision has been enlarged to include straight and curved tooth mill files. The revision omits 55 items which the OPM, in a letter to the industry dated Aug. 6, 1941, requested be discontinued for the duration of the emergency. Mimeographed copies of the proposed revision may be obtained free from the Division of Simplified Practice, Bureau of Standards.



MARVEL SAWS

Cut anything that will go between the jaws

This is one of five No. 18 MARVEL Giant Hydraulic Hack Saws used by a well known Texas tool company to cut-off "multiple bars of alloy steel in round, square, and flat shapes, up to the maximum capacity of the large work-throat (18" x 18")".

These super hack saws are designed for the largest sizes, and toughest steels—up to 18" x 18". After a year's heavy duty service, when asked as to the effectiveness of these saws in solving the cutting-off problems at this plant, the mechanical engineer in charge reported them "very effective."

ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5700 Bloomingdale Ave. Chicago, U. S. A.
Eastern Sales Office: 225 Lafayette St., New York

SCRAP

. . . MARKET ACTIVITIES AND QUOTATION TRENDS

Supply Situation at More Favorable Level

• • • **The iron and steel scrap** supply situation at major consumption centers has reached a comfortable level considering the high rate of usage. Aided by favorable weather and the impetus of wrecking programs and public drives, the volume of scrap is better than at any time in nearly a year.

Another factor in the return to normalcy is the relaxation in the loading of mixed grades of scrap by removing the $2.50 a ton penalty and allowing all mixed grades in a shipment to move at the price of the lowest grade. Soon after the amendment was made official, the movement began of scrap which had been accumulating due to the hardship of the $2.50 rule.

At Pittsburgh the fact that supplies seem to be flowing better reflects in a marked lack of interest for remote scrap. It is also reported there that the use of tin can scrap has dropped. The cans are piling up because of various local drives and publicity on saving such containers. It is said, however, that even though they are not used as scrap in steel making, they may at a later date be utilized for reclaiming tin unless accumulations become unwieldy. A pronounced scarcity of scrap, however, would probably find many sources willing to accept some tin can scrap.

West Coast mills are going far afield for scrap in order to maintain operations. See "West Coast" in this issue on page 74.

Even though the supply situation has undergone considerable improvement, scrap collectors and consumers are thinking seriously about the necessity for building stockpiles for next winter. In some quarters, the use of moderate amounts of inferior scrap at this time is advocated, rather than heavy use of light grades at some later date when the overall supply situation is less favorable than it is now.

One new obstacle appears to have arisen, however. This is an order placing limitations on truck transportation. A report from St. Louis this week indicates that scrap collections have been affected in that vicinity by the Office of Defense Transportation ruling designed to eliminate less-than-capacity loads.

Scrap Search Yields Huge Iron Ornaments

Milwaukee

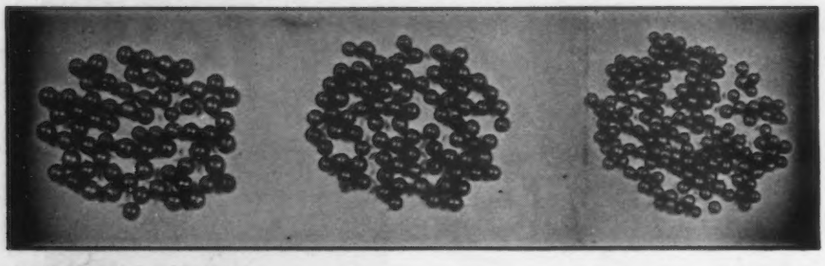
• • • While searching for scrap metal through its various warehouses, the city purchasing department unearthed two cast iron ornaments apparently intended for the second cruiser Milwaukee and sent to this city in error. The prow decorations are huge affairs 16 ft. long and 9 ft. high, covered with gold leaf. City Purchasing Agent Nicholson recommended they be given to the government free of charge.

Ruling on Mixed Shipments Finally Is Made Official

Washington

• • • **As finally announced** on Wednesday of last week by OPA, an amendment to the iron and steel scrap schedule eliminated the $2.50 differential on mixed shipments. The liberalizing amendment, effective May 18, states that when grades of scrap commanding different maximum prices are included in one vehicle, the maximum price of the scrap in the vehicle shall be that of the lowest priced grade in the shipment. Before being amended the paragraph provided a price of $2.50 per gross ton under the price applicable to the lowest grade in the shipment.

The limitation in the amendment does not affect shipments involving vessel movement if each grade commanding a different maximum price is segregated in the vessel. The lifting



HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

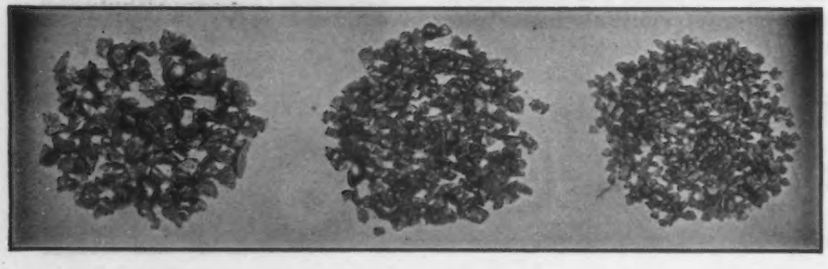
Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

HARRISON ABRASIVE CORPORATION

MANCHESTER, NEW HAMPSHIRE

HEAT-TREATED STEEL GRIT



of this limitation on vessel shipment is designed to facilitate the Great Lakes shipments of scrap which can be segregated in bulkheads.

PITTSBURGH — Steel companies operating under injunctions obtained by the OPA restraining them from violations of scrap rulings are finding it more difficult to obtain scrap than steel companies which have not been cited. The reason behind this, it is said, is the reluctance of some scrap dealers to ship scrap to points which will bend over backwards in making rejections in order to make sure the law is not violated.

OPA on Tuesday obtained in the Federal district court in Pittsburgh a temporary restraining order enjoining Jones & Laughlin Steel Corp., and Allegheny Ludlum Steel Corp., and three iron and steel scrap brokers from violation of OPA price ceilings. The steel companies were enjoined from buying in excess of the legal ceilings and the scrap companies were enjoined from selling in excess of the ceilings.

•

TORONTO—The supply of scrap at various basing points in Canada has taken a definite turn for the better as a result of the improvement in offerings from the rural districts and mining centers.

•

CHICAGO—The flow of scrap outside of industrial material is still suffering from the effects of the recent OPA court action here. Yard shippers are still moving very hesitantly in making shipments. Most of the smaller dealers are still trying to interpret OPA's views in the light of their practical problems and the strict grading requirements is increasing the time required to sort and prepare a car. Some balers report that the necessity of following OPA's grading views is cutting daily production by as much as 40 per cent.

On top of the grading problem, dealers are also confronted with an ODT edict which becomes effective June 1, that truck movements of over 15 miles must involve loads in both directions. Few, if any dealers, have been able to solve the problem of how to collect scrap in the yard if it must move out in the same direction from which it came.

•

BUFFALO—Trainees from war industry courses in Buffalo schools were put to work recently salvaging thousands of tons of scrap metal and rubber in local auto graveyards. The WPB enlisted their assistance in answer to complaints from yard operators that labor was not available.

Meanwhile, improvement in the flow of scrap continues. Four lake boats brought approximately 30,000 tons of assorted scrap here recently. In addition, five barges of scrap from New York City with about 3000 tons unloaded at Fort Erie, Ont., for reshipment to the Atlas Steel Co., Ltd., at Welland, Ont. Another 2000 tons is reported en route to the Canadian port. Buffalo plants have received about 6500 tons of scrap by barge from New York so far this year.

EAST LIVERPOOL, OHIO — It is expected that 400 tons of abandoned street car rails will be salvaged here for national defense uses. WPB will assume ownership of the rails and provide jobs for 70 WPA workers for 45 days. The Ohio State Highway Department has opened bids for resurfacing two of the streets from which the rails are to be taken.

•

CHICAGO—A goal of 15,000 tons of steel and iron scrap has been set by Standard Oil Co. of Indiana for the "Get in the Scrap" campaign at its six refineries in 1942. More than 2000 tons already have been saved by the Whiting, Ind., refinery alone in the first three months of this year.

•

JERSEY CITY—New Jersey will be divided into seven scrap regions for the "Salvage for Victory" program. Benjamin Schwartz, vice-president of Schiavone-Bonomo Corp., presided at the first regional meeting held May 12 at Newark, at which a Regional Advisory Committee of eight waste material dealers was elected, to cooperate with the local salvage committees in the region.

•

BIRMINGHAM—The collection of 15,668 tons of iron and steel scrap during April, an increase of 3690 tons over March, by the Industrial Salvage Committee of Associated Industries of Alabama, is one of the factors helping scrap receipts here.

BOSTON — Turnings, borings, bundled material and some heavy melting steel continue to move to consumers with regularity now. Those interests specializing in automobile graveyard scrap appear to be getting fairly good tonnages for reshipment to mills. Abandoned street rails and the Boston Elevated structure are moving to previous designated mills.

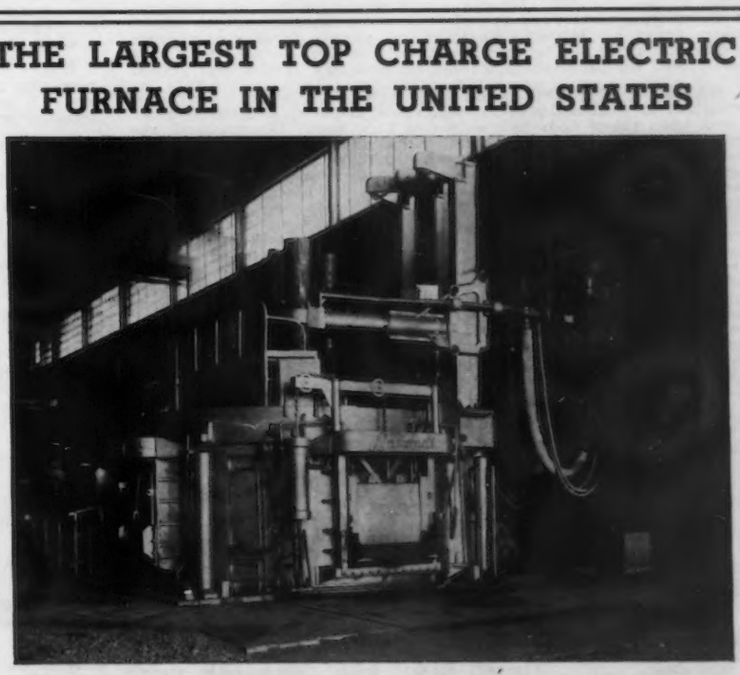
•

BUFFALO — With the district's own scrap drive exceeding all expectations, conservative estimates of scrap dealers this week placed the tonnage moved so far this year at 35 per cent greater than in the same period of 1941.

•

NEW YORK—Approximately 200 scrap metal dealers met at the Hotel Roosevelt last week to discuss a proposed mileage schedule for transporting scrap metals in the sellers' own trucks. The meeting was called by OPA to work out a schedule as a means of controlling delivered prices. Scrap metal ceilings are fixed f.o.b. shipping point basis, representatives of OPA pointed out, and the problem of controlling allowances for cartage when delivery is made in the sellers' trucks "has proved a troublesome one." The tentative mileage schedule presented here was the same as that discussed by scrap dealers in Chicago. The tentative rates follow: 1 to 20 miles, $1.10 a ton; 21 to 30, $1.30; 31 to 40, $1.50; 41 to 50, $1.70; 51 to 60, $1.90; 61 to 70, $2.10; 71 to 80, $2.25; 81 to 90, $2.40, and 91 to 100, $2.55.

THE LARGEST TOP CHARGE ELECTRIC FURNACE IN THE UNITED STATES



LECTROMELT furnaces are built in sizes ranging from 100 tons to 25 pounds. Both door charge and top charge types are available. Rugged and durable construction. Rapid and economic operation.

PITTSBURGH LECTROMELT FURNACE CORP.
PITTSBURGH, PA.

SCRAP PRICES

(All the prices given below are per gross tons and are basing point prices from which shipping point prices and consumer's delivered prices are to be computed)

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

	BASIC OPEN HEARTH GRADES (No. 1 Heavy Melting; No. 1 Hydr. Compressed Black Sheets; No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)	Machine Shop Turnings	BLAST FURNACE GRADES (Mixed Borings and Turnings; Shovelling Turnings; No. 2 Busheling; Cast Iron Borings)	ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES											
				Low Phos.			Heavy Structural and Plate			Cut Auto. Steel Scrap			Alloy free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
				Billet, Bloom, Forge Crops	Bar Crops and Smaller	Punchings and Plate	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under			
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	$20.00	$16.00	$16.00	$25.00	$22.50	$22.50	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	15.50	15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Chicago, Claymont, Costesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt.	18.75	14.75	14.75	23.75	21.25	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Ashland, Ky.	19.50	15.50	15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	15.25	15.25	24.25	21.75	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	14.25	14.25	23.25	20.75	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth, Minn.	18.00	14.00	14.00	23.00	20.50	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	13.85	13.85	22.85	20.35	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo, Ohio	.....	13.85	13.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo.	17.50	13.50	13.50	22.50	20.00	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	13.00	13.00	22.00	19.50	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	12.50	12.50	21.50	19.00	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle, Wash.	14.50	10.50	10.50	19.50	17.00	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50
Portland, Ore.	.....	.....	.....	.....	15.50	15.50	14.00	14.50	15.00	13.00	13.50	14.00	11.00	12.50	14.00

BUNDLES consisting exclusively of tin coated material and compressed into charging box size, are $4 per gross ton below No. 2 dealers' bundles. Bundles containing tin coated material but not composed exclusively of such material (outlawed by order M-24-b) are $8 below No. 2 dealers' bundles.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Published dock charges prevail, or if unpublished 75c. per ton must be included as part of the deduction.* Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus lowest switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

*At Memphis deduct 50c.; Great Lakes ports $1; New England $1.25.

REMOTE SCRAP: Defined as all grades of scrap listed in table above located in North Dakota, South Dakota, Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon and Utah. The delivered price of remote scrap may exceed by more than $1, but not more than $5, the price at the basing point nearest the consumer's plant, provided detailed statement under oath is furnished OPA. Where delivered price would exceed by more than $5 the price at basing point nearest consumer, user must apply to OPA for permission to absorb the additional charges. For exceptions see official order.

UNPREPARED SCRAP: The maximum prices established hereinabove are maximum prices for prepared scrap. For unprepared scrap, maximum prices shall be $2.50 less than the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge $2.50 per ton on consumer-owned unprepared remote scrap (see order).

Where more than one grade of scrap is included in a shipment, the maximum price of all scrap in the vehicle is that of the lowest price grade in the shipment. This limitation does not apply to vessel shipments if grades are segregated.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

CAST IRON BORINGS: (No more than 0.5 per cent oil content; for chemical use), add $5 to price of cast iron borings.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of $2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA, of the shipping point, transportation charges and details of the sale.

RAILROAD SCRAP

(Per gross ton, delivered consumers' plants located on line.)

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails 3 ft. and Under	Scrap Rails 2 ft. and Under	Scrap Rails 18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown	$20.50	$21.50	$23.00	$23.50	$23.75	$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington,	19.75	20.75	22.25	22.75	23.00	23.25
Birmingham, Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
Kokomo, Ind.	19.25	20.25	21.75	22.25	22.50	22.75
Seattle	15.50	16.50	18.00	18.50	18.75	19.00
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

Other Than Railroad Scrap

	Group A	Group B	Group C
No. 1 machinery cast, drop broken, 150 lbs. and under	$18.00	$19.00	$20.00
No. 1 cupola cast	18.00	19.00	20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	17.50	18.50	19.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	16.50	17.50
Charging box size cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B; switch district of Kansas City, Kan., Mo.

. . . Comparison of Prices

(Advances Over Past Week in **Heavy Type**; Declines in *Italics*. Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel: (Cents Per Lb.)	May 19, 1942	May 12, 1942	Apr. 21, 1942	May 20, 1941
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling bilelts	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	May 19, 1942	May 12, 1942	Apr. 22, 1942	May 20, 1941
No. 2 fdy., Philadelphia	$25.89	$25.89	$25.84	$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.68	24.68	24.06	24.06
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.39	25.39	25.34	25.34
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	31.34	31.34	31.34	31.34
Ferromanganese‡	135.00	135.00	120.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Los phots. plate, Youngs'n	22.50	22.50	23.00	23.00
No. 1 cast, Pittsburgh	20.00	20.00	20.00	22.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	24.00
No. 1 cast, Ch'go	20.00	20.00	20.00	20.00
Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$6.00	$6.00	$6.00	$6.125
Foundry coke, prompt	6.875	6.875	6.875	6.875
Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.25
Zinc, East St. Louis	8.25	8.25	8.25	7.25
Lead, St. Louis	6.35	6.35	6.35	5.70
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 128 to 136 herein.

. . . Composite Prices

	FINISHED STEEL	PIG IRON	SCRAP METAL
May 19, 1942	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton

	HIGH	Low	HIGH	LOW	HIGH	LOW
1942	2.30467c.,	2.30467c.,	$23.61	$23.61	$19.17	$19.17
1941	2.30467c.,	2.30467c.,	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99629c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71 May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

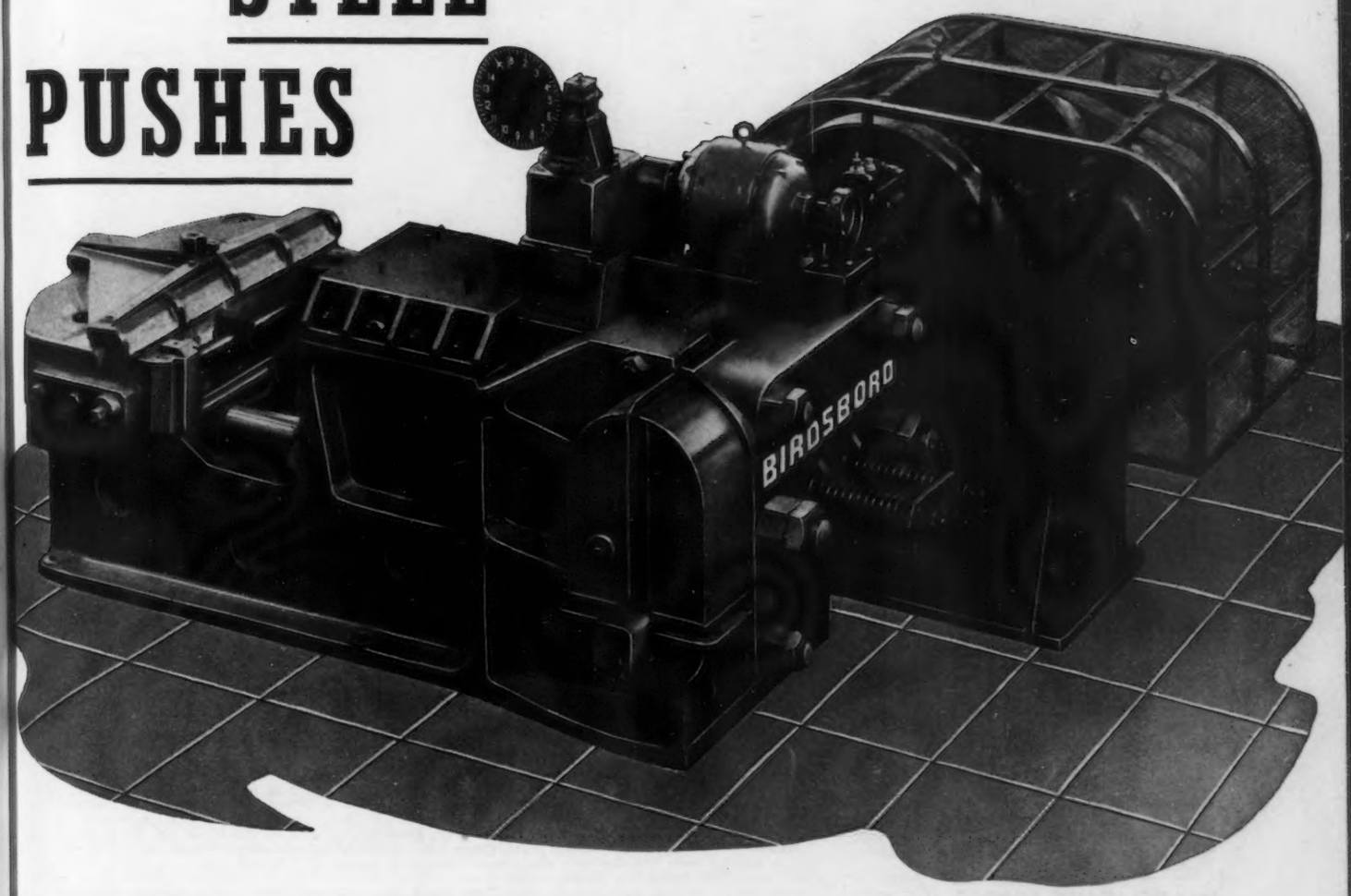
Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars[10]	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.22¢	2.35¢	2.28¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.17¢	3.41¢	3.39¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.75¢	3.68¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.47¢	3.73¢	3.69¢
Long ternes[2]	3.80¢		3.80¢									4.55¢		4.18¢	4.14¢
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.22¢	2.48¢	
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester =3.00¢)					2.92¢	3.18¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.58¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester =3.35¢)					3.07¢	3.33¢	
TIN PLATE															
Standard cokes, base box	$5.00	$5.00	$5.00						$5.10					5.38¢	5.34¢
BLACK PLATE															
29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢[13]			3.39¢
TERNES, M'FG.															
Special coated, base box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth =2.25¢)			2.52¢	2.80¢	2.27¢	2.51¢	2.49¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.52¢	2.80¢[14]			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.52¢	2.55¢[14]	2.27¢	2.40¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.52¢	2.55¢	2.27¢		2.49¢
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit =2.70¢)					3.01¢	2.99¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massilon, Canton =2.70¢					2.82¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.47¢		
PLATES								(Coatesville and Claymont =2.10¢)							
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢[11]		2.47¢	2.65¢	2.27¢	2.30¢	2.155¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.72¢	4.00¢		3.73¢	3.69¢
Alloy	3.50¢	3.50¢			(Coatesville =3.50¢)						3.97¢	4.15¢		3.71¢	3.60¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem =2.10¢)			2.47¢	2.75¢		2.28¢	2.22¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester =3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester =4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester =6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester =8.55¢)								
WIRE[9]															
Bright[15]	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester =2.70¢)					3.10¢			2.94¢
Galvanized	add proper size extra and galvanized extra to bright wire base, above.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester =3.30¢)					3.70¢			3.54¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.74¢
IRON BARS[12]															
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] These prices do not apply if the customary means of transportation (rail and water) are not used. [11] Ship plates only. [12] Common iron bars quoted at 2.15c. by Terre Haute, Ind. producer. [13] Boxed. [14] Portland and Seattle price, San Francisco price is 2.50c. [15] This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

STEEL PUSHES PRODUCTION UP!



FEATURES

Pressure — 600 tons

Capacity — Round and square bars up to 9"

Speed — 33 strokes per minute

Center adjustable from 16" to 60"

This 600-ton Birdsboro Gag Press helps to speed production by straightening round and square steel bars of any size up to 9 inches.

Featuring a speed of 33 strokes per minute and stationary dies adjustable from 16" to 60" centers, this Gag Press was delivered *complete* with auxiliary equipment . . . motor-operated loading device, entering and delivery tables, manipulator for turning round and square bars, push-offs and cradles.

It *pays* to consult Birdsboro when *you* have a mill equipment problem.

BIRDSBORO STEEL FOUNDRY AND MACHINE COMPANY

Plants at Birdsboro and Reading, Pa.

BUILDERS OF: Steel Mill Equipment • Hydraulic Presses • Rolls • Special Machinery • Crushing Machinery

BIRDSBORO

STEEL MILL EQUIPMENT

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2 higher; f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.25 higher.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland.	2.00c
Worcester, Mass.	2.10c
Birmingham	2.00c
San Francisco	2.50c
Galveston	2.25c

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

Pittsburgh, Chicago, Canton Massillon, Buffalo, or Bethlehem, per gross ton $54.00

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per Lb.
High speed	67c
Straight molybdenum	54c
Tungsten-molybdenum	57½c
High-carbon-chromium	43c
Oil hardening	24c
Special carbon	22c
Extra carbon	18c
Regular carbon	14c

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston††	$25.53	$25.03	$26.53	$26.03	.....	.....
Brooklyn	27.65	.....	.....	28.15	.....	.....
Jersey City	26.62	26.12	27.62	27.12	.....	.....
Philadelphia	25.89	25.39	26.89	26.39	.....	.....
Bethlehem, Pa.	**$25.00**	**$24.50**	**$26.00**	**$25.50**	.....	.....
Everett, Mass.††	**25.00**	**24.50**	**26.00**	**25.50**	.....	.....
Swedeland, Pa.	**25.00**	**24.50**	**26.00**	**25.50**	.....	.....
Steelton, Pa.	.....	**24.50**	.....	.....	**$29.50**	.....
Birdsboro, Pa.	**25.00**	**24.50**	**26.00**	**25.50**	**29.50**	.....
Sparrows Point, Md.	**25.00**	**24.50**	.....	.....	.....	.....
Erie, Pa.	**24.00**	**23.50**	**25.00**	**24.50**	.....	.....
Neville Island, Pa.	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Sharpsville, Pa.*	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Buffalo	**24.00**	**23.00**	**25.00**	**24.50**	**29.50**	.....
Cincinnati	24.68	24.68	.....	25.18	.....	.....
Canton, Ohio	25.47	24.97	25.97	25.47	.....	.....
Mansfield, Ohio	26.06	25.56	26.56	26.06	.....	.....
St. Louis	24.53	24.05	.....	.....	.....	.....
Chicago	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....$31.34
Granite City, Ill.	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Cleveland	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Hamilton, Ohio	**24.00**	**23.50**	.....	**24.00**	.....	.....
Toledo	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Youngstown*	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Detroit	**24.00**	**23.50**	**24.50**	**24.00**	.....	.....
Lake Superior fc.	.....	.....	.....	.....	.....	**$28.00**
Lyles, Tenn. fc.†	.....	.....	.....	.....	.....	**33.00**
St. Paul	26.76	.....	27.26	26.76	.....	.....
Duluth	**24.50**	.....	**25.00**	**24.50**	.....	.....
Birmingham	**20.38**	**19.00**	**25.00**	.....	.....	.....
Los Angeles	27.25	.....	.....	.....	.....	.....
San Francisco	27.25	.....	.....	.....	.....	.....
Seattle	27.25	.....	.....	.....	.....	.....
Provo, Utah	**22.00**	.....	.....	.....	.....	.....
Montreal	27.50	27.50	.....	28.00	.....	.....
Toronto	25.50	25.50	.....	26.00	.....	.....

GRAY FORGE IRON

Valley or Pittsburgh furnace $23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at $1 per gross ton above maximum prices.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

†Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

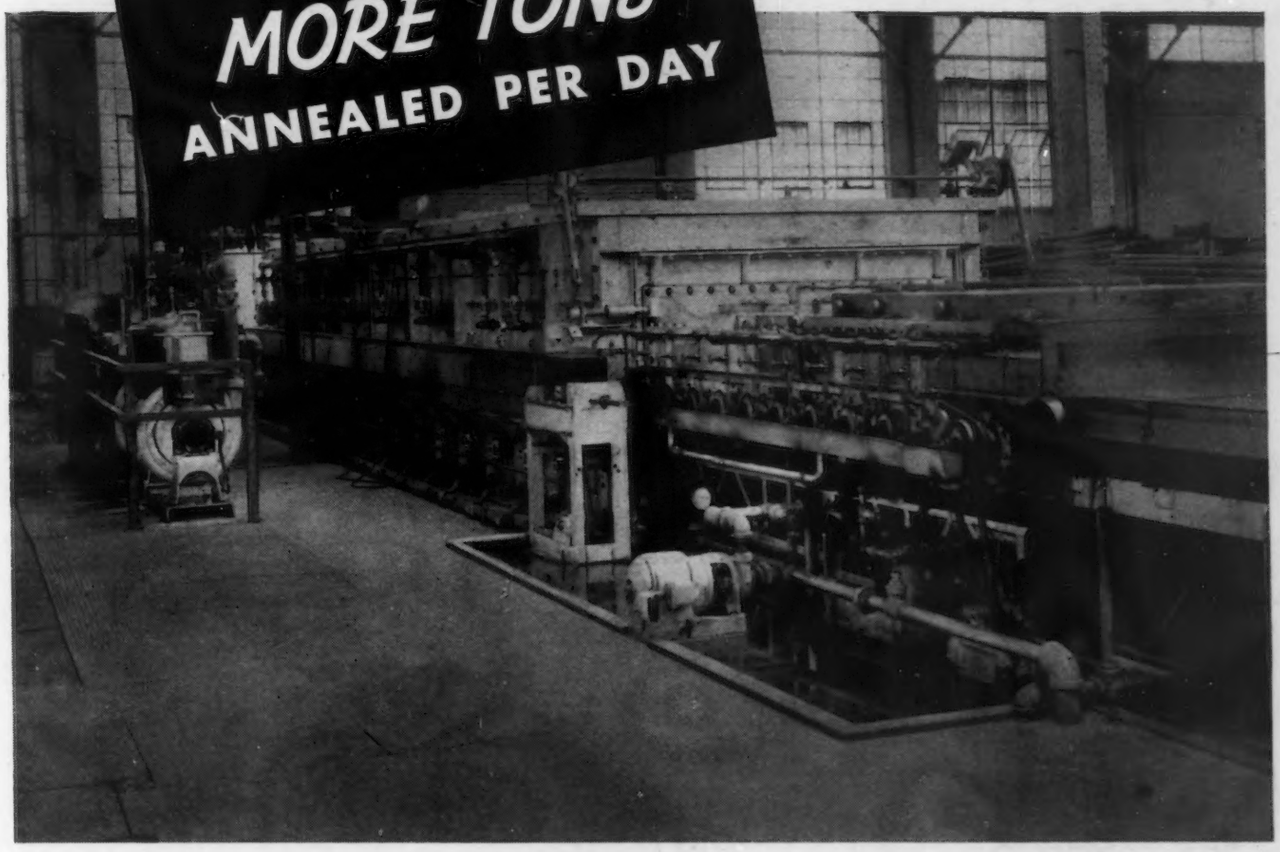
WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. See THE IRON AGE, *Dec. 25, 1941, page 88, for details of OPA Price Schedule No. 49, covering steel resale prices. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. city prices are used in conformance with Schedule 49.)*

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los† Angeles
Sheets, hot rolled (10 ga.)	$3.35	$3.25	$3.35	$3.55	$3.58	$3.43	$3.25	$3.71	$3.45	$3.39	$3.50	$3.38	$4.95
Sheets, cold rolled	....	4.10	4.05	4.05	4.60	4.30	4.30	4.68	....	4.24	4.35	4.23	7.50
Sheets, galv. (24 ga.)	4.65	4.85	4.62	5.05	5.00	4.84	4.75	5.11	4.75	4.99	5.00	4.98	5.95
Strip, hot rolled	3.60	3.60	3.50	3.51	3.96	3.68*	3.82	4.06	3.70	3.74	3.85	3.73	4.90
Strip, cold rolled	3.20	3.50	3.20	3.31	3.51	3.40	3.52	3.46	....	3.61	3.83	3.54	....
Plates (¼ in. & heavier)	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.90
Structural shapes	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.60
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	4.35
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.48	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.45	7.35	7.55	7.31	7.60	7.67	7.35	7.75	....	7.72	7.45	7.58	9.55
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300	8.40	8.40	8.40	8.56	8.84	8.70	8.40	8.88	....	8.77	8.84	8.63	10.55
Bars, cd. drn. SAE 3100	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23	....	7.12	7.44	6.98	9.55

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. * 12 gage and heavier, $3.43. † Los Angeles prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.

MORE TONS ANNEALED PER DAY



NINE TONS *of cartridge brass slabs are annealed per hour in this Roller Hearth Furnace built by the W. F. Rockwell Company and insulated with lightweight Armstrong's Refractories. Construction is extremely rugged throughout to handle this high production rate.*

Lightweight Armstrong's Refractories can help keep your furnaces at peak efficiency

TURNING out tonnage and more tonnage is your vital job today. Efficient Armstrong's Refractories can help you do it . . . *faster* and *cheaper!* How? By holding heat accurately in the temperature ranges you want, by saving fuel, by cutting maintenance time and expense!

Five Armstrong's Brick (for temperatures from 1600°-2600° F.) have physical characteristics which make them ideally suited to most furnace applications. These valuable characteristics include:

HIGH INSULATING EFFICIENCY: All Armstrong's Brick effectively bar heat loss. They aid in controlling temperatures throughout the furnace and thus help to insure uniform, high quality production.

LOW HEAT STORAGE: These lightweight refractories heat and cool quickly—a factor that means faster cycles in intermittent type furnaces with less fuel per cycle.

HIGH PHYSICAL STRENGTH: Every Armstrong's Brick is highly resistant to spalling, has exceptional crushing and breaking strength, and ample refractoriness for the use intended.

You save installation time, too, when Armstrong's Brick are used. They reach the job in good condition and lay up quickly. Special shapes are made to order . . . standard sizes can be easily cut, notched, and shaped right on the job. This workability speeds construction.

Armstrong has a complete line of refractories and cements. And Armstrong's engineers are ready at all times to help solve furnace insulation problems. Get complete facts. Write today to Armstrong Cork Co., Insulating Refractories Dept., 978 Concord St., Lancaster, Pennsylvania.

ARMSTRONG'S INSULATING REFRACTORIES

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
*Motor	4.95c.
*Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent off List

Machine and Carriage Bolts:

6½ in., shorter and smaller	65½
6 x ⅝ in., and shorter	63½
6 in. by ¾ to 1 in. and shorter	61
1⅛ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose 71 and 10

Stove bolts in packages, with nuts attached 71

Stove bolts in bulk.....80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.75

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham .....65 and 5

Cap and Set Screws

Per Cent Off List

Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	68
Milled studs	40
Flat head cap screws, listed sizes	30
Filister head cap, listed sizes	46

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg

Standard wire nails	$2.55
Coated nails	2.55
Cutnails, carloads	3.85

Base per 100 Lb.

Annealed fence wire	$3.05

Base Column

Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Hot Rolled	Lap Weld, Hot Rolled
	$	$	$
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 BW.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)

Base Price—$200 per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as Above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.

CAST IRON WATER PIPE

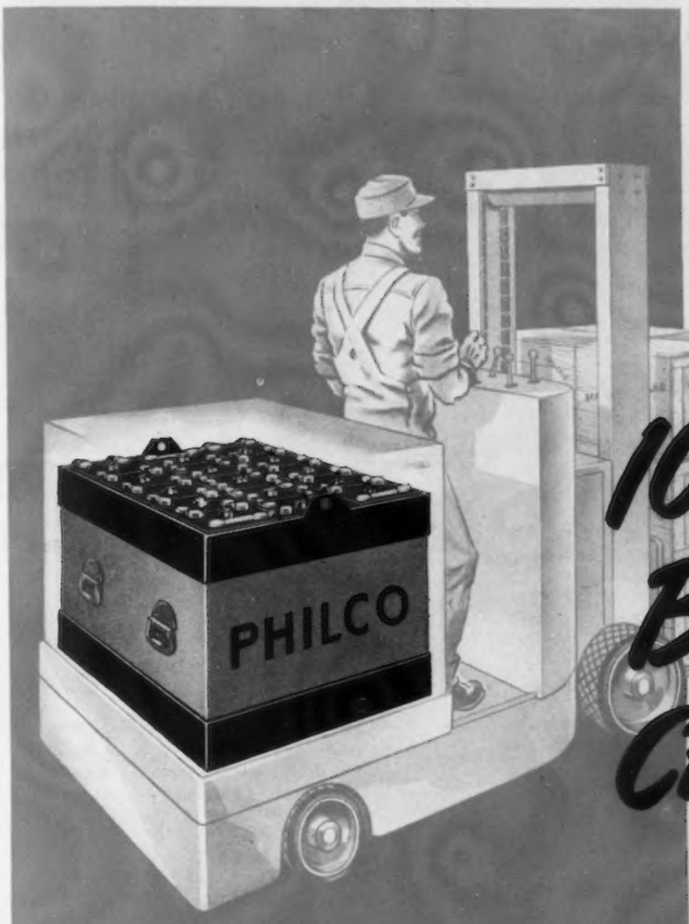
Per Net Ton

6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago. $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle.

FUEL OIL

No. 3 f.o.b. Bayonne, N. J.	5.20c.
No. 6, f.o.b. Bayonne, N. J.	4.285c.
No. 6 Bur. Stsd., del'd Chicago	4.75c.
No. 3 distillate del'd Cleveland	6.50c.
No. 4 indus., del'd Cleveland	6.00c.
No. 5 indus., del'd Cleveland	5.25c.
No. 6 indus., del'd Cleveland	5.25c.



WORK YOUR ELECTRIC TRUCKS

10% LONGER BETWEEN CHARGES!

PLATE FOR PLATE, PHILCO XL STORAGE BATTERIES GIVE YOU 10% GREATER CAPACITY

To meet today's stepped-up war production schedules, motive power batteries for your electric industrial trucks must have the extra wallop . . . the extra capacity to deliver sustained high voltage hour after hour, all day long!

Philco's oversize XL grids, plus other Philco engineering developments, give you a positive 10% greater capacity at no increase in overall battery size. Only in a Philco do you get this vital reserve of power!

For dependable, economical industrial truck power—use Philco Storage Batteries!

LONG PRODUCTIVE LIFE . . . SUSTAINED HIGH VOLTAGE . . . LOW MAINTENANCE COSTS, TOO!

- **Philco's "K" Process produces a flint-hard plate of exceptional porosity with a superior bond between material and grid.**
- **Philco's heavy, rugged construction stands up under constant jolting and hard usage. Specify Philco!**
- **Triple Insulation, as developed by Philco, adds months of reliable service to your truck batteries by sealing the active material in the grid with Glass Fibre Mats . . . Slotted Rubber Retainers . . . rugged Philco Separators.**

WRITE FOR NEW CATALOG

Just out—new Philco Industrial Truck Battery catalog. Write for your copy today.
Philco Storage Battery Division,
473 Calhoun Street, Trenton, N. J.

PHILCO *Storage Batteries*

FIFTIETH ANNIVERSARY
PHILCO
1892 1942

PHILCO'S NEW TRENTON, N. J., PLANT HAS TRIPLED PRODUCTION FACILITIES OF PHILCO STORAGE BATTERIES

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads).....$135.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk).....$74.50
50% (ton lots, packed)..... 87.00
75% (carload lots, bulk).....135.00
75% (ton lots, packed).....151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)

F.o.b. Jackson,* Ohio.....$29.50*
Buffalo 30.75*

For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorus or over.

*Official OPA price established June 24, 1941.

Bessemer Ferrosilicon

Prices are $1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb., Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon.....13.00c.
2 carbon .....19.50c.
1 carbon .....20.50c.
0.10 carbon .....22.50c.
0.06 carbon .....23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon $113.00*
2.50 carbon 118.00*
2 carbon 123.00*
1 carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload..... $2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V, del'd $2.70 to $2.90†
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots..... $2.25†
Ferrocarbontitanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload, contract, net ton.....$142.50
Ferrocarbontitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload, contract, net ton.....$157.50
Ferrophosphorus, electric or blast furnace material, carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage freight, equaled with Rockdale, Tenn., gross ton..... $58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage, freight equalized with Nashville, gross ton..... $75.00
Ferromolybdenum, per lb, Mo, f.o.b. furnace ..... 95c.
Calcium molybdate, per lb. Mo., f.o.b. furnace..... 80c.
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.... 80c.
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa. 80c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)

Per Gross Ton

Old range, bessemer, 51.50.....$4.75
Old range, non-bessemer, 51.50. 4.60
Mesaba, bessemer, 51.50..... 4.60
Mesaba, non-bessemer, 51.50... 4.45
High phosphorus, 51.50..... 4.35

Foreign Ores*

(C.i.f. Philadelphia or Baltimore, Exclusive of Duty)

Per Unit

African, 46-48 Mn.....66.5c. to 68c.
Indian, 48-50 Mn.....68c. to 70c.
Brazilian, 46-48 Mn.....67c. to 68c.
Cuban, 51 Mn.....81c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered.....$24 to $26
Tungsten, domestic scheelite, at mine .....$24.00 to $25.00
Chrome ore, lump, c.i.f. Atlantic Seaboard, per gross ton; South African (low grade)..$28.00
Rhodesian, 45 .....Nom.
Rhodesian, 48 .....Nom.

*Importations no longer readily available. Prices shown are nominal.

COKE*

Furnace

Per Net Ton

†Connellsville, prompt $6.00

Foundry

†Connellsville, prompt..$6.75 to $7.00

*Maximum by-product coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. Maximum beehive furnace coke prices established by OPA, Jan. 26. †F.O.B. oven.

By-product, Chicago $12.25
By-product, New England.....$13.75
By-product, Newark..$12.40 to $12.95
By-product, Philadelphia $12.38
By-product, Cleveland $12.30
By-product, Cincinnati $11.75
By-product, Birmingham .....$8.50†
By-product, St. Louis.....$12.02
By-product, Buffalo $12.50

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton.....$40.00
Angle bars, 100 lb..... 2.70

(F.o.b. Basing Points) *Per Gross Ton*

Light rails (from billets).....$40.00
Light rails (from rail steel)....39.00

Base per lb.

Cut spikes ..... 3.00c.
Screw spikes ..... 5.15c.
Tie plates, steel..... 2.15c.
Tie plates, Pacific Coast..... 2.30c.
Track bolts ..... 4.75c.
Track bolts, heat treated, to railroads ..... 5.00c.
Track bolts, jobbers discount....63-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Iebanon, Pa., Richmond.

FLUORSPAR

Fire Clay Brick *Per Net Ton*

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail.....$25.00
Domestic, f.o.b. Ohio River landing barges 25.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines..... 25.00
Foreign, 85% calcium fluoride, not over 5% Si, c.i.f. Atlantic ports, duty paid.....Nominal
Domestic No. 1 ground bulk, 95 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines....$34.00
As above, in bags, f.o.b. same mines 36.40

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick *Per 1000*

Super-duty brick, St. Louis....$64.60
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 51.30
First quality, New Jersey..... 56.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois 46.55
Second quality, New Jersey... 51.00
No. 1, Ohio..... 43.00
Ground fire clay, net ton..... 7.60

Silica Brick

Pennsylvania $51.30
Chicago District 58.90
Birmingham 51.30
Silica cement, net ton (Eastern) 9.00

Chrome Brick *Per Net Ton*

Standard, f.o.b. Baltimore, Plymouth Meeting and Chester...$54.00
Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester, Pa. 54.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester $76.00
Chemically bonded, f.o.b. Baltimore 65.00

Grain Magnesite

Domestic, f.o.b. Baltimore and Chester in sacks (carloads)..$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk) 22.00